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ENERGY SUPPLY AND USE IN THE CANADIAN DOMESTIC MARKET

1971-1981

(including an assessment of the Energy Content of Commodities destined for export)

(selected manufactures)

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Trends in Energy Supply and Use in the Canadian Domestic Market: 1971-1981

(including an assessment of the Energy Content of Commodities destined for export: selected manufactures)

1. Objectives of the Analysis

The purpose of this analysis is to provide an illustrative example and a suitable base for a wider review of resource husbandry for sustainable, efficient and prosperous socio-economic progress for Canadians.

More specifically, the study was intended

1. To consolidate and refine annual energy supply and disposition statistics;

2. To present a "historical profile" of energy supply and disposition trends over the period 1971-1981;

3. To assess the contribution of hydro and nuclear power in terms of their imputed "input" values;

4. To account for "losses" in the system, e.g. in the conversion of "heat" to useful (mechanical) work;

5. To illustrate the role of "hidden energy exports";

6. To provide a base from which to assess the "true cost" of energy and other resources that are incorporated, but apparently undervalued in Canadian exports;

7. To focus greater attention upon the need for a review of trends, options and opportunities in the structure of the Canadian economy.

This analysis is offered, in order to provide a possibly unexplored perspective and a springboard for further analyses and for policy development. Such effort, it is contended, should materially contribute to a more circumspect husbanding of energy and other resource supplies in Canada as well as a more deliberate orientation of future economic development.

2. The Global Background

The Report of the Independent Commission of International Development Issues (The Brandt Commission) suggested that:

> "Current trends point to a sombre future for the world economy and international relations. A painful outlook for the poorer countries with no end to poverty and hunger; continuing world stagnation combined with inflation; international monetary disorder; mounting debts and deficits; protectionism; **major tensions between countries competing for energy, food and raw materials;** growing world population and more unemployment in North and South; increasing threats to the environment and the international commons through deforestation and desertification, overfishing and overgrazing, the pollution of air and water, and overshadowing everything the menacing arms race.
>
> For these trends to continue is dangerous enough, but they can easily worsen. A number of poor countries are threatened with the irreversible destruction of their ecological systems; many more face growing food deficits and possible mass starvation. In the international economy there is the possibility of competitive trade restrictions or devaluations; a collapse of credit with defaults by major debtors, or bank failures, a deepening recession under possible energy shortages or further failures of international cooperation; and intensified struggle for spheres of interest and influence or for control over resources, leading to

military conflicts. The 1980's could witness even greater catastrophes than the 1930's."

The Global 2000 Report to the President (of the United States) similarly concluded that:

"... if present policies continue, a number of world problems will have become more severe and more intertwined by the turn of the century than they are today. In this circumstance a number of developments can be anticipated in the world economy that would have significant implications for the future of Canada."

The following paragraphs provide a summary overview of some of the basic issues considered relevant to economic development planning in Canada.

The document "Economic Development for Canada in the 1980's" published by the Department of Finance in November 1981, emphasized that "The leading opportunity lies in the development of Canada's rich bounty of natural resources ... (including) ... food products, such as grain and fish, forest products and ... energy-based industries...

"... Canada has always been envied for its resource wealth, the high incomes we enjoy are very much the dividend that natural resource development has paid." "... Canadian economic development in the 1980's will be dominated by ... the continued development and expansion of the resource based industries ..." The document also intimated that "The federal government will be undertaking new initiatives in support of five key resource based sectors ..." The key areas were then identified as energy, agriculture, fisheries, forest based industries and the mining industry.

This support for a resource based economic development was widely welcomed. However, the overall assumptions adopted for this policy orientation, regarding opportunities and constraints, may call for some closer scrutiny in order to ensure that aspirations and plans remain consistent between various responsibility centres and actors in the Canadian economy. In the

course of encouraging the export of resource based commodities from Canada, attention should rightly be focussed upon the value that is added to these resources by means of processing and upgrading.

Where resources embodied in commodities are however undervalued, it would seem prudent, to say the least, to reevaluate Canadas options for progress, just in case that the country becomes locked into a development trajectory that threatens the resource base, fritters away needed and possible revenues and turns out to be merely ephemeral and non-sustainable over the longer term. The longheld perception of a virtually unlimited resource base in Canada is slowly giving way today to an understanding that the natural wealth of Canada, while more than adequate to meet all the needs, demands and indeed fancies of a population even in excess of 30-35 million people, is nevertheless just a drop in the ocean, when considered in relation to the needs of a global population, projected to reach some 6 billions by the dawn of the next millenium, just a little more than a decade and a half away.

The continued exploitation of basic resources, such as land, water, forests, fish, etc., at progressively higher levels, is increasingly being questioned by those, who are concerned that such extrapolation of trends does not appear to be sustainable over an indefinite period. Consequently attention is being focussed upon the need for a more deliberate husbanding of the available resource base in Canada and the possible restructuring of the economy for more prolonged, sustainable progress and prosperity. Canada indeed possesses the means for a mighty spree right now or for an auspicious future. There may not be enough for both: there is no free lunch!

3. The Canadian Energy Complex: An illustrative example showing the role of hidden resource exports in the Economy

The energy sector of the Canadian economy was selected in this study to illustrate the role that resources and in particular resource exports (often hidden in commodities and frequently undervalued) play in the country's economic development (see attached Flow diagram showing the Canadian Energy Supply & Disposition profile for the period 1971-1981 that also displays the increasing energy content of commodities destined for export markets).

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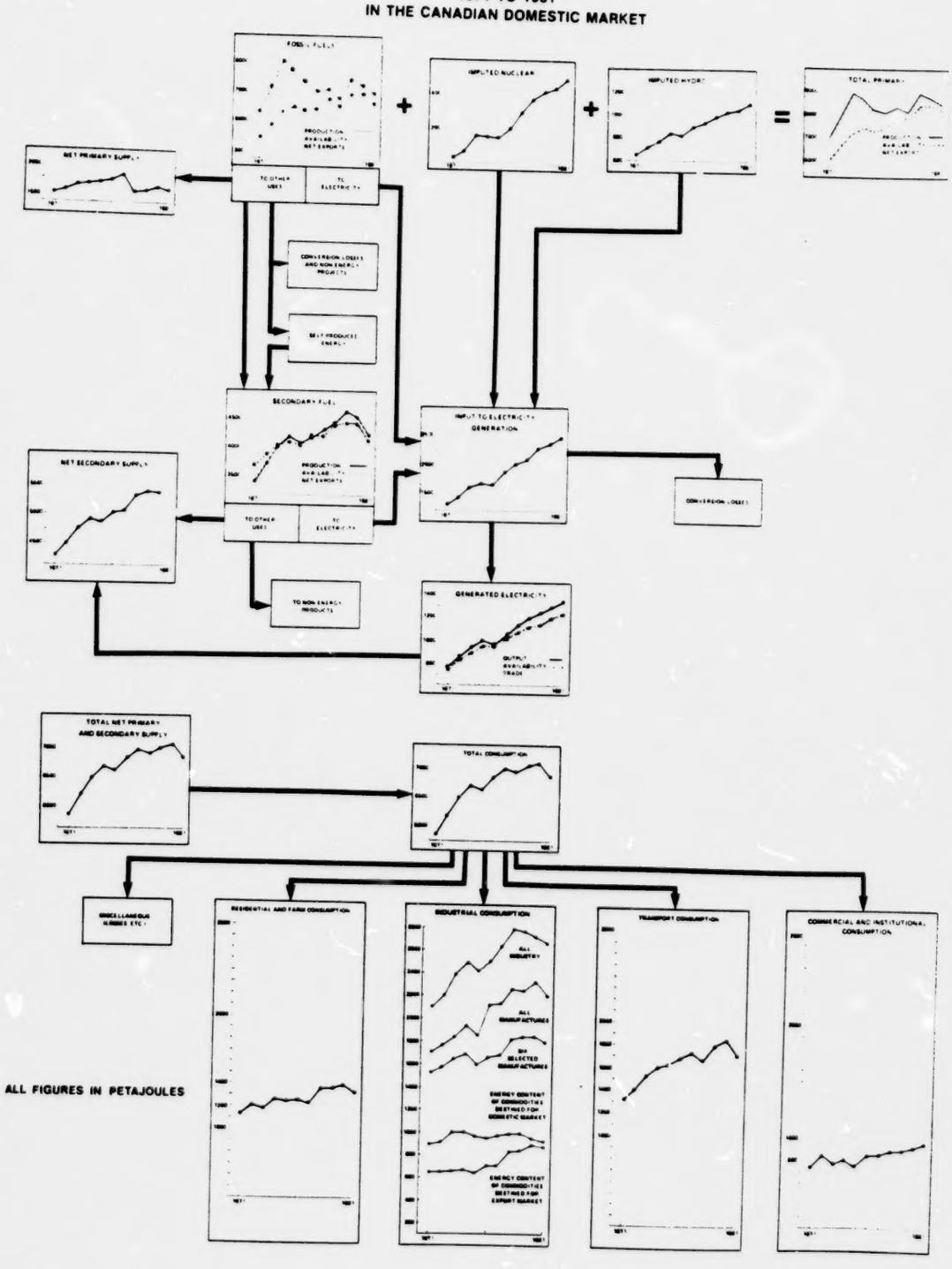
FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION 1971 TO 1981 IN THE CANADIAN DOMESTIC MARKET



ALL FIGURES IN PETAJOULES

The supply of generally underpriced resources in the Economy only encourages their substitution for labour, which in the process becomes progressively more highly protected and uncompetitive in world markets. Such development may be more readily acceptable, of course, in the midst of apparently "infinite" resource abundance, but when limitations or new cost structures emerge on the horizon, the traditional approaches may lead to major economic and social problems and calamities.

The tables developed for purposes of this illustrative analysis and discussion, provide an account of the production and direct use of energy, in order to identify in the first place,

i) significant industrial users of energy,

ii) producers of energy-intensive commodities and,

iii) the export of energy "hidden" in energy intensive commodities.

The often neglected quantities of energy produced by the manufacturing industry itself are specifically identified in this analysis. The significance of the recycling of combustible materials to high energy users, is clearly apparent from the charts and tabulations.

Extensive use of data from Statistics Canada and Energy Mines and Resources, provided the means for the construction of comprehensive time series covering 1971 to 1981. While some problems have been encountered in the course of this study, because of changes and improvements in surveys in 1974 and 1978 (the old series were discontinued) and because of certain gaps in the statistical coverage that existed before 1974, these have generally been resolved. Certain estimates made by Statistics Canada have also been used from time to time, to complete the data, since, for example, not all producers indicated the disposition of fuel by type in the standard questionnaires, nor indeed were all consumers surveyed. In total, the data now compiled, display general trends and orders of magnitudes involved as an illustration of developments that have taken and are taking place, not only

in energy supply and disposition, but in other areas of resource deployment also.

4. Discussion

Energy supply and disposition is used to illustrate the role of natural resources in the economy of Canada. Besides published energy statistics, this analysis also highlights the role of "hidden energy" in energy accounting. "Hidden energy" is used, in this discussion, to distinguish between energy supply and disposition by producers or utilities, usually accounted for in published statistics and the energy embodied in commodities, with particular focus upon supplies destined for export. (The analysis examines only the direct energy consumption in the manufacturing process and does not extend to the indirect energy use as calculated by means of input/output analysis.)

The analysis now presented, relies on the updated Energy Supply & Demand tabulations attached. The assembled data are also shown in a set of "Flow Diagrams" for each year of the period 1971 to 1981. A summary profile of developments over the period is provided on page 5 in the form of a graphical chart. In assessing the role of "hidden energy exports", the energy use of six major manufacturers was analyzed, but the cement industry was excluded because became apparent that current exports from Canada are relatively insignificant. It was noted that, within the industrial sector, manufacturing industries consumed between 76% and 86% of total energy supplies, the remainder being divided between utilities, mining and construction. Over the period examined, the five leading energy intensive industries, identified as important in regards to exports, represented more than 78% of energy used by manufacturing industries in each year.

Table 1 below reveals that virtually all self-produced energy during the period examined, i.e. electricity and combustible by-products, was generated by the five large consumers specifically surveyed[1]. Over the decade, the five manufacturing industries, increased the use of self-produced energy by

1. It has been assumed that consumption is identical to production, though recently Statistics Canada has been collecting data on the sale of surplus steam by manufacturers and utilities.

some 38%, while increasing their energy purchases by only 7% (see Table 2 below). Other manufacturers and the remainder of the industrial sector show much larger increases in purchased fuel and electricity, i.e. 24% and 28%, respectively. Residential energy consumption over the same period increased by 16% and total Canadian energy consumption by 17%. Clearly a great many factors contribute to these developments, but in the face of world fuel price hikes in 1973 and 1978, the large energy consumers have clearly found cost-effective use for some of their by-products.

Table 1 also shows that in the five selected manufacturing industries only 17% of the self-produced energy is in the form of electricity. The combustion of waste material, evidently does relieve the demand on traditional fuel supplies, since in the absence of such redeployment of otherwise wasted resources, the required energy would have had to come from more conventional sources. It is considered likely that, as a result of increased competition and rising costs, industry will continue to economize in similar ways and that the energy resource base in Canada will, in consequence, prove to be that much larger.

Table 1 Breakdown of Self-Produced Energy

1978 Petajoules

Industry by S.I.C.	Self-Generated Electricity	Waste Material Combustion	Total Self-Produced Energy
Pulp and Paper	32	251	288
Iron and Steel	1	-	1
Smelting & Refining	91	25	116
Industrial Chemicals	6	109	115
Petroleum Refineries	-	277	277
Total Selected Manufactures	135 (17%)	662 (83%)	797
Total Manufactures	141	662	803
Total Industry	144	662	806

Source: Energy Cascading Potential in Canadian Industry EMR Industries Series Publication 3a, Dec. 1981.

Table 2 Changes in Industrial Energy Consumption 1971-81

	Purchased	Self-Produced	Total
Five Selected Manufacturing Industries	+ 7%	+38%	+18%
All Manufacturers	+28%	--	+30%
Total Industry	+24%	--	+27%

Source: Attached tabulations showing the Assessment of Indirect (Hidden) Energy Exports.

With regards to the value of Canadian exports, the energy intensive industries contribute some 28% to 37% ($19.4 Billion in 1981) of total manufacturing exports. Manufacturing as a whole contributes approximately 80% of total industrial exports. If the energy content of these exports is considered, (using the ratio of exports to value of shipments or industrial output in the case of smelting and refining), it is apparent that more than 40% of the energy consumed by manufacturing industry in Canada is "exported" (see last column of tabulation showing an Assessment of Indirect Energy Exports). The largest exporters are the pulp & paper and the smelting & refining industries.

In general, the five leading energy intensive manufacturing industries have evidently found it profitable and attractive to export primary or semi-processed goods. While they accounted for approx. 25% of the total Canadian energy use (80%-90% of all energy used by the manufacturing industry), their contribution to GNP was on average a mere 5%. This would seem to suggest that a closer scrutiny of the structural characteristic of the Canadian economy may be timely, if not overdue. The Canadian Balance of Payments deficit has been minimized, as a result of healthy surpluses in commodity exports based largely on the resource extracting sectors: agriculture, mining, forestry, and other primary industries. It is becoming increasingly questionable however as to whether the sustainable capacity of Canada's resource base can support the cost of service payments for an indefinite period into the future.

5. The Statistics and the Tabulations (Technical notes)

In this paper all energy statistics are shown in petajoules (10^{15} Joules); where data were given in British Thermal Units in source documents, these were converted at the rate of 1054 Joules per BTU. (All energy figures are rounded to the nearest petajoule. Dollar values are given in millions of 1983 Canadian dollars.)

A. Energy Supply-Demand Table

Energy Supply (lines 1-20) and consumption (lines 21-30) are tabulated so as to sum both horizontally and vertically. The primary fuels: coal, LPGs, crude oil, natural gas, wood (included in the "other fuels" column) are, in general, directly combustible. Secondary energy comprises energy that is produced from primary sources and which requires the use of energy (i.e. energy "expenditure") in refining, e.g. coke, gasoline. No attempt was made to identify these energy requirements by fuel type: - the use of energy by petroleum refineries, for example, is simply included, as a bulk figure, within industrial energy consumption. The secondary energy identified under the column "other fuels", refers to the non-purchased, self-produced energy in industry, e.g. electricity or heat from bark, black liquor and other combustible by-products generated by industry.

Both primary and secondary energy supplies are thus shown in the tabulations i.e. availability of a fuel type to the Canadian domestic market (line 5) is arrived at by adding imports to production and by deducting exports. Primary energy supplies used for the generation of electricity (by thermal plants) or refined into specific end-products are accounted separately (e.g. compare line 5 and line 10). In the case of crude oil, almost the entire "available supply" is "converted" to secondary energy by oil distillers. Fuels used by utilities (lines 6 and 16) comprise mainly coal, heavy fuel oil and natural gas. In an attempt to consistently identify and account for energy inputs to

electricity generation (line 1) from water and nuclear power, 4,216 megajoules are imputed as energy "inputs" for each kilowatt hour of hydroelectricity output. For nuclear-generated electricity, 12,648 megajoules of energy input per 1 kilowatt hour output are adopted.

The total supply of primary and secondary energy is traced to four sectors of use, viz. industrial, Commercial/Institutional, Residential/Farm and Transportation. The last is, in turn, disaggregated into the various transport sectors. Industrial consumption of energy (line 28) shows the total of purchased energy plus the self-produced energy. Specific details are provided in the notes attached to the tables.

B. Flow Diagram of Energy Supply and Consumption

The flow diagrams show the energy path from source to final use. In the upper parts of the charts, energy flows are shown with available energy from fossil fuels used for electricity generation or for "other uses" i.e. primary supply of fuel (e.g. coal, natural gas). Energy losses in conversion of electricity and to secondary fuel production are shown in the flow diagram as well as energy used in the manufacture of non-energy products by refineries. Self-produced energy is added into the flow chart at this point.

The summary flow chart covers, in one set, the eleven years under study and provides, at a glance, a perspective of changes in energy production and use.

C. Assessment of Indirect Energy Exports

Six industries were selected on the basis of their significance in the Canadian economy and their high energy consumption; their contribution to total industrial activity and GNP are displayed. The table was

developed to indicate the significance of hidden exports of energy through shipments of energy intensive commodities (Five significant manufacturers). Details regarding data used and methods of calculations appear in the notes to the tables.

ENERGY SUPPLY & DEMAND CANADA 1971

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	405			163	3,297										2,403	25	644	48		6,985	1
2	Exports	205			97	1,669										961					2,932	2
3	Imports	478				1,494										15					1,987	3
4	Adjustments, stock change, transfer and losses	-5			-10	-4										5					-14	4
5	Availability	673			56	3,118										1,462	25	644	48		6,026	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	381														76		644	48		1,149	6
7	ii) By industry	5														25					30	7
8	b) To coke, steam	199																			199	8
9	c) To refined products				12	3,106															3,118	9
10	Net Primary Energy Supply:	88			44	12										1,361	25				1,530	10
	Secondary Energy Supply:																					
11	Outputs		134	43	32		96	920	137	372	485	693	7	6	93		369			779	4,166	11
12	Exports		5		1			3	1	2	8	64			2					25	111	12
13	Imports		17					23	9	23	62	198	13		9					12	366	13
14	Adjustments, stock change transfer and losses		-4		-9		7	29	-26	-72	100	7		1	-1						32	14
15	Availability		142	43	22		103	969	119	321	639	834	20	7	99		369			766	4,453	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									6	5	71									82	16
17	ii) By industry		2							2	1	29									34	17
18	b) To Non-Energy products												16								16	18
19	Net Secondary Energy Supply:		140	43	22		103	969	119	313	633	734	4	7	99		369			766	4,321	19
20	Total Net Primary and Secondary Energy Supply:	88	140	43	66		103	969	119	313	633	734	4	7	99	1,361	394			766	5,851	20
	Consumption:																					
21	Transportation: Road							955		52											1,007	21
22	Rail	2							1	79	2	10									94	22
23	Air													7	98						105	23
24	Marine	4								36	1	72									113	24
25	Total	6						955	1	167	3	82		7	98						1,319	25
26	Residential & Farm	11			55				83	37	457	37				265	25			167	1,137	26
27	Commercial & Institutional	8							11	21	111	218				232				156	757	27
28	Industrial	59	132	42	11	6	101	1	18	83	64	359	2			477	369			375	2,095	28
29	Miscellaneous (losses, etc.)	4	8	1		6	2	13	6	5	-2	38	2		1	387				68	539	29
30	TOTAL CONSUMPTION	88	140	43	66	12	103	969	119	313	633	734	4	7	99	1,361	394			766	5,851	30

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ENERGY SUPPLY & DEMAND CANADA 1972

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPG[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	461			201	3,804										2,699	25	720	81		7,991	1
2	Exports	263			129	2,132										1,064					3,588	2
3	Imports	502				1,768										17					2,287	3
4	Adjustments, stock change, transfer and losses	-65			-6	-16 3,424										-8					-95	4
5	Availability	635			66											1,644	25	720	81		6,595	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	368														111		720	81		1,280	6
7	ii) By industry	3														37					40	7
8	b) To coke, steam	199																			199	8
9	c) To refined products				15	3,439															3,454	9
10	Net Primary Energy Supply:	65			51	-15										1,496	25				1,622	10
	Secondary Energy Supply:																					
11	Outputs		136	44	30		103	1,020	142	398	515	818	9	7	103		379			865	4,569	11
12	Exports		3					4	1	1	12	174			6					40	241	12
13	Imports		13					16	11	16	65	171	11	1	13					9	326	13
14	Adjustments, stock change transfer and losses		8		-8		7	5	-29	-66	131	1			-6						43	14
15	Availability		154	44	22		110	1,037	123	347	699	816	20	8	104		379			834	4,697	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									7	2	69									78	16
17	ii) By industry		2							2	1	32									37	17
18	b) To Non-Energy products												16								16	18
19	Net Secondary Energy Supply:		152	44	22		110	1,037	123	338	696	715	4	8	104		379			834	4,566	19
20	Total Net Primary and Secondary Energy Supply:	65	152	44	73	-15	110	1,037	123	338	696	715	4	8	104	1,496	404			834	6,188	20
	Consumption:																					
21	Transportation: Road							1,021		57											1,078	21
22	Rail	1							1	83	1	11									97	22
23	Air													8	103						111	23
24	Marine	3							1	40	1	78									123	24
25	Total	4						1,021	2	180	2	89		8	103						1,409	25
26	Residential & Farm	12			58				89	40	497	20				297	25			181	1,219	26
27	Commercial & Institutional	5							11	23	121	227				281				187	885	27
28	Industrial	47	139	43	13	5	109	1	18	90	70	380	2			516	379			393	2,203	28
29	Miscellaneous (losses, etc.)	-3	13	1	2	-20	1	15	3	5	6	-1	2		1	402				75	502	29
30	TOTAL CONSUMPTION	65	152	44	73	-15	110	1,037	123	338	696	715	4	8	104	1,496	404			834	6,188	30

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ENERGY SUPPLY & DEMAND CANADA 1973

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	496			231	4,385										2,877	25	771	171		8,956	1
2	Exports	302			155	2,536										1,083					4,076	2
3	Imports	452				1,921										16					2,389	3
4	Adjustments, stock change, transfer and losses	8			-7											-61					-60	4
5	Availability	654			69	3,770										1,749	25	771	171		7,209	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	352														157		771	171		1,451	6
7	ii) By industry	3														44					47	7
8	b) To coke, steam	230																			230	8
9	c) To refined products				26	3,760															3,786	9
10	Net Primary Energy Supply:	69			43	10										1,548	25				1,695	10
	Secondary Energy Supply:																					
11	Outputs		157	52	34		119	1,107	157	427	565	867	10	7	122		389			968	4,961	11
12	Exports				1			18		3	8	210			9					59	308	12
13	Imports		10		1			1	2	5	26	156	17	1	12					8	239	13
14	Adjustments, stock change transfer and losses		2		-9		9	33	-50	-37	89	-3			-6						28	14
15	Availability		169	52	25		128	1,123	109	392	672	810	27	8	119		389			897	4,920	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									7	3	70									80	16
17	ii) By industry		2							2	2	32									38	17
18	b) To Non-Energy products												23								23	18
19	Net Secondary Energy Supply:		167	52	25		128	1,123	109	383	667	708	4	8	119		389			897	4,779	19
20	Total Net Primary and Secondary Energy Supply:	69	167	52	68	10	128	1,123	109	383	667	708	4	8	119	1,548	414			897	6,474	20
	Consumption:																					
21	Transportation: Road							1,106		75											1,181	21
22	Rail	1							1	83	6	8									99	22
23	Air													8	118						126	23
24	Marine	3								42	1	86									132	24
25	Total	4						1,106	1	200	7	94		8	118						1,538	25
26	Residential & Farm	8			55				83	44	461	22				286	25			194	1,178	26
27	Commercial & Institutional	2				5			8	25	102	150				269				205	766	27
28	Industrial	42	156	51	14	5	126	1	11	110	90	442	2			556	389			417	2,412	28
29	Miscellaneous (losses, etc.)	13	11	1	-1		2	16	6	4	7		2		1	437				81	580	29
30	TOTAL CONSUMPTION	69	167	52	68	10	128	1,123	109	383	667	708	4	8	119	1,548	414			897	6,474	30

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	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	526			239	4,120										2,803	23	844	166		8,721	1
2	Exports	293			149	2,023										1,012					3,477	2
3	Imports	371				1,832										14					2,217	3
4	Adjustments, stock change, transfer and losses	61			-7	1										-37					18	4
5	Availability	665			83	3,930										1,768	23	844	166		7,479	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	370														127		844	166		1,507	6
7	ii) By industry	2														46					48	7
8	b) To coke, steam	225																			225	8
9	c) To refined products				28	3,951															3,979	9
10	Net Primary Energy Supply:	68			55	-21										1,595	23				1,720	10
	Secondary Energy Supply:																					
11	Outputs		157	51	38		122	1,171	153	452	573	920	10	7	136		413			1,008	5,211	11
12	Exports		4					5	4	14	186				7					55	275	12
13	Imports		15						2	11	3	100	20		10					9	170	13
14	Adjustments, stock change transfer and losses		-7		-7		11	-2	-53	-26	99	-6	1	1	-7						4	14
15	Availability		161	51	31		133	1,164	102	433	661	828	31	8	132		413			962	5,110	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									9	2	77									88	16
17	ii) By industry		2							2	2	30									36	17
18	b) To Non-Energy products												27								27	18
19	Net Secondary Energy Supply:		159	51	31		133	1,164	102	422	657	721	4	8	132		413			962	4,959	19
20	Total Net Primary and Secondary Energy Supply:	68	159	51	86	-21	133	1,164	102	422	657	721	4	8	132	1,595	436			962	6,679	20
	Consumption:																					
21	Transportation: Road							1,147		89											1,236	21
22	Rail	1							1	98	3	8									107	22
23	Air													7	131						138	23
24	Marine	2								42	1	74									119	24
25	Total	3						1,147	1	225	4	82		7	131						1,600	25
26	Residential & Farm	7			70				77	47	481	36				309	23			213	1,263	26
27	Commercial & Institutional	1							8	22	81	161				300				234	807	27
28	Industrial	36	156	49	16		131	17	12	124	86	441	2			614	413			425	2,500[k]	28
29	Miscellaneous (losses, etc.)	21	3	2		-21	2	16	4	4	5	1	2	1	1	372[h]				90[j]	503	29
30	TOTAL CONSUMPTION	68	159	51	86	-21	133	1,164	102	422	657	721	4	8	132	1,595	436			962	6,679	30

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ENERGY SUPPLY & DEMAND CANADA 1975

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	634			246	3,528										2,847	25	810	142		8,232	1
2	Exports	356			148	1,567										998					3,069	2
3	Imports	474				1,839										11					2,324	3
4	Adjustments, stock change, transfer and losses	-94			-24	6										-60					-172	4
5	Availability	658			74	3,806										1,800	25	810	142		7,315	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	394														150		810	142		1,496	6
7	ii) By industry	2														45					47	7
8	b) To coke, steam	221																			221	8
9	c) To refined products				43	3,775															3,818	9
10	Net Primary Energy Supply:	41			31	31										1,605	25				1,733	10
	Secondary Energy Supply:																					
11	Outputs		152	49	39		130	1,212	151	442	511	834	9	8	142		429			984	5,092	11
12	Exports		3					21		7	29	129			4					41	234	12
13	Imports		16						1	4	4	49	16		2					14	106	13
14	Adjustments, stock change transfer and losses		-9		6		11	15	-57	-10	137	-12			-1						80	14
15	Availability		156	49	45		141	1,206	95	429	623	742	25	8	139		429			957	5,044	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									10	2	82									94	16
17	ii) By industry									2	2	26									30	17
18	b) To Non-Energy products		1										22								23	18
19	Net Secondary Energy Supply:		155	49	45		141	1,206	95	417	619	634	3	8	139		429			957	4,897	19
20	Total Net Primary and Secondary Energy Supply:	41	155	49	76	31	141	1,206	95	417	619	634	3	8	139	1,605	454			957	6,630	20
	Consumption:																					
21	Transportation: Road							1,191		95											1,286	21
22	Rail	1							1	88	2	7									99	22
23	Air													8	138						146	23
24	Marine	1								32	1	60									93	24
25	Total	2						1,191	1	215	3	67		8	138						1,624	25
26	Residential & Farm	5			62				69	53	456	33				316	25			230	1,249	26
27	Commercial & Institutional								9	19	81	104				308				234	755	27
28	Industrial	26	154	47	15		137	1	12	126	73	430	1			585	459			392	2,428	28
29	Miscellaneous (losses, etc.)	8	1	2	-1	31	4	14	4	4	6		2		1	396				101	574	29
30	TOTAL CONSUMPTION	41	155	49	76	31	141	1,206	95	417	619	634	3	8	139	1,605	454			957	6,630	30

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ENERGY SUPPLY & DEMAND CANADA 1976

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	620			242	3,234										2,864	28	897	208		8,093	1
2	Exports	343			182	1,057										1,005					2,587	2
3	Imports	438				1,615										4					2,057	3
4	Adjustments, stock change, transfer and losses	-7			11	-24										-23					-43	4
5	Availability	708			71	3,768										1,840	28	897	208		7,520	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	444														120		897	208		1,669	6
7	ii) By industry															19					19	7
8	b) To coke, steam	222																			222	8
9	c) To refined products				49	3,774															3,823	9
10	Net Primary Energy Supply:	42			22	-6										1,701	28				1,787	10
	Secondary Energy Supply:																					
11	Outputs		152	50	52		129	1,227	162	466	517	765	24	8	144		434			1,058	5,188	11
12	Exports		2					18		2	5	121								46	194	12
13	Imports		8							5	1	55	19							13	101	13
14	Adjustments, stock change transfer and losses		3		-4			25	-68	-15	133	71			-5						140	14
15	Availability		161	50	48		129	1,234	94	454	646	770	43	8	139		434			1,025	5,235	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									11	4	116									131	16
17	ii) By industry		2							3	2	10									17	17
18	b) To Non-Energy products												24								24	18
19	Net Secondary Energy Supply:		159	50	48		129	1,234	94	440	640	644	19	8	139		434			1,025	5,063	19
20	Total Net Primary and Secondary Energy Supply:	42	159	50	70	-6	129	1,234	94	440	640	644	19	8	139	1,701	462			1,025	6,850	20
	Consumption:																					
21	Transportation: Road							1,219		141											1,360	21
22	Rail	1								87											88	22
23	Air													8	137						145	23
24	Marine									33		64									97	24
25	Total	1						1,219		261		64		8	137						1,690	25
26	Residential & Farm	3	1		51				67	58	451	23				330	28			255	1,267	26
27	Commercial & Institutional								13	22	123	97				331				257	843	27
28	Industrial	37	153	49	19		125	1	10	96	58	460	15			665	434			406	2,528	28
29	Miscellaneous (losses, etc.)	1	5	1		-6	4	14	4	3	8		4		2	375[f]				107[g]	522	29
30	TOTAL CONSUMPTION	42	159	50	70	-6	129	1,234	94	440	640	644	19	8	139	1,701	462			1025	6,850	30

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ENERGY SUPPLY & DEMAND CANADA 1977

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	685			245	3,238										2,967	28	929	314		8,406	1
2	Exports	356			198	730										1,054					2,338	2
3	Imports	463				1,495															1,958	3
4	Adjustments, stock change, transfer and losses	-23			9	5										3					-6	4
5	Availability	769			56	4,008										1,916	28	929	314		8,020	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	516														107		929	314		1,866	6
7	ii) By industry															25					25	7
8	b) To coke, steam	202																			202	8
9	c) To refined products				51	3,993															4,044	9
10	Net Primary Energy Supply:	51			5	15										1,784	28				1,885	10
	Secondary Energy Supply:																					
11	Outputs		140	45	54		145	1,243	158	512	538	832	33	8	146		439			1,142	5,433	11
12	Exports		2					17		2	16	122								72	231	12
13	Imports		11							5	3	86	25							10	140	13
14	Adjustments, stock change transfer and losses		-3		2		2	30	-75	-25	46	-24			-7						-57	14
15	Availability		146	45	56		147	1,256	83	490	571	772	58	8	139		438			1,080	5,289	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									7	4	115									126	16
17	ii) By industry									4		8									12	17
18	b) To Non-Energy products												31								31	18
19	Net Secondary Energy Supply:		146	45	56		147	1,256	83	479	567	649	27	8	139		438			1,080	5,120	19
20	Total Net Primary and Secondary Energy Supply:	51	146	45	61	15	147	1,256	83	479	567	649	27	8	139	1,784	466			1,080	7,003	20
	Consumption:																					
21	Transportation: Road							1,240		166											1,406	21
22	Rail	1								89											90	22
23	Air													8	138						146	23
24	Marine									33		62									95	24
25	Total	1						1,240		288		62		8	138						1,737	25
26	Residential & Farm	4			50				60	60	402	19				331	28			276	1,230	26
27	Commercial & Institutional								10	23	108	86				352				278	857	27
28	Industrial	45	143	44	18		145	1	9	103	53	484	24			732	438			433	2,672[k]	28
29	Miscellaneous (losses, etc.)	1	3	1	-7	15	2	15	4	5	4	-2	3		1	369[j]				93[j]	507	29
30	TOTAL CONSUMPTION	51	146	45	61	15	147	1,256	83	479	567	649	27	8	139	1,784	466			1,080	7,003	30

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ENERGY SUPPLY & DEMAND CANADA 1978

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	743			231	3,195										2,610	30	987	372		8,168	1
2	Exports	399			154	595										929					2,077	2
3	Imports	427				1,375															1,802	3
4	Adjustments, stock change, transfer and losses	17			-29	36										-17					7	4
5	Availability	788			48	4,011										1,664	30	987	372		7,900	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	527														78		987	372		1,964	6
7	ii) By industry															18					18	7
8	b) To coke, steam	208																			208	8
9	c) To refined products				33	4,021										89					4,143	9
10	Net Primary Energy Supply:	53			15	-10										1,479	30				1,567	10
	Secondary Energy Supply:																					
11	Outputs		143	47	61		151	1,271	141	525	507	799	36	8	161		5299			1,209	5,129	11
12	Exports		2		2			30		5	51	171			14					78	353	12
13	Imports		12							1	2	78	25		1					6	125	13
14	Adjustments, stock change transfer and losses		-5		3		6	58	-66	-20	136	22	1	1	-3						133	14
15	Availability		148	47	62		157	1,299	75	501	594	728	62	9	145		529			1,137	5,034	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									8	3	126									137	16
17	ii) By industry									5		9									14	17
18	b) To Non-Energy products												31								31	18
19	Net Secondary Energy Supply:		140	47	62		157	1,299	75	488	591	593	31	9	145		529			1,137	4,852	19
20	Total Net Primary and Secondary Energy Supply:	53	148	47	77	-10	157	1,299	75	488	591	593	31	9	145	1,479	559			1,137	6,878	20
	Consumption:																					
21	Transportation: Road							1,191		165											1,356	21
22	Rail									89											89	22
23	Air													1	118						119	23
24	Marine									39		68									107	24
25	Total							1,191		293		68		1	118						1,671	25
26	Residential & Farm	4			45			92	51	55	401	17				403	30			286	1,384	26
27	Commercial & Institutional	2							13	23	133	75		7	26	339				268	886	27
28	Industrial	46	148	47	31		154	1	7	120	50	435	28			658	529			473	2,727	28
29	Miscellaneous (losses, etc.)	1			1	-10	3	15	4	-3	7	-2	3	1	1	79				110	210	29
30	TOTAL CONSUMPTION	53	148	47	77	-10	157	1,299	75	489	591	593	31	9	145	1,479	559			1,137	6,878	30

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ENERGY SUPPLY & DEMAND CANADA 1979

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	811			281	3,600										2,805	32	1,025	421		8,975	1
2	Exports	400			216	644										1,055					2,315	2
3	Imports	520				1,364															1,884	3
4	Adjustments, stock change, transfer and losses	-53			4	-23										-16					-90	4
5	Availability	876			69	4,297										1,734	32	1,025	421		8,454	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	584														81		1,025	421		2,111	6
7	ii) By industry															23					23	7
8	b) To coke, steam	245																			245	8
9	c) To refined products				37	4,318										90[f]					4,445	9
10	Net Primary Energy Supply:	47			32	-21										1,540	32				1,630	10
	Secondary Energy Supply:																					
11	Outputs		164	54	58		166	1,326	150	573	563	832	35	8	176		524[g]			1,270	5,899	11
12	Exports		5		2			29		12	69	136			7					113	353	12
13	Imports		7					3		4	1	29	26							6	76	13
14	Adjustments, stock change transfer and losses		-11		-16		3	40	-82	-2	64	-12		1	-4						-19	14
15	Availability		155	54	40		169	1,340	68	563	599	733	61	9	165		524			1,163	3,603	15
	Transformed to other energy:																					
16	a) To electricity																					
17	i) By utilities									8	2	115									125	16
18	ii) By industry									5		9									14	17
	b) To Non-Energy products											12	25								37	18
19	Net Secondary Energy Supply:		155	54	40		169	1,340	68	550	557	597	36	9	165		524			1,163	5,427	19
20	Total Net Primary and Secondary Energy Supply:	47	155	54	72	-21	169	1,340	68	550	557	597	36	9	165	1,540	556			1,163	7,057	20
	Consumption:																					
21	Transportation: Road				2			1,238		192											1,432	21
22	Rail									93											93	22
23	Air													1	136						137	23
24	Marine									48		90									48	24
25	Total				2			1,238		333		90		1	136						1,800	25
26	Residential & Farm	4			31			90	69	58	384	22				416	32			300	1,316	26
27	Commercial & Institutional	1			15				12	23	120	60		7	27	349				279	893	27
28	Industrial	42	155	54	24	2	162		6	143	47	425	35			656	524			474	2,787	28
29	Miscellaneous (losses, etc.)					-23	7	12	1	-7	6		1	1	2	81[h]				110[i]	191	29
30	TOTAL CONSUMPTION	47	155	54	72	-21	169	1,340	68	550	557	597	36	9	165	1,540	556			1,163	7,057	30

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ENERGY SUPPLY & DEMAND CANADA 1980

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	891			315	3,444										2,600	31	1,059	454		8,796	1
2	Exports	448			211	460										860					1,959	2
3	Imports	469				1,241															1,710	3
4	Adjustments, stock change, transfer and losses	16			-18	-29										25					-6	4
5	Availability	928			86	4,196										1,785	31	1,059	454		8,539	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	652														61		1,059	454		2,226	6
7	ii) By industry															23					23	7
8	b) To coke, steam	228																			228	8
9	c) To refined products	1			56	4,207										149[f]					4,413	9
10	Net Primary Energy Supply:	47			30	-11										1,552	31				1,649	10
	Secondary Energy Supply:																					
11	Outputs		151	50	71		164	1,332	145	577	546	751	36	8	174		5379				5,863	11
12	Exports		2		10			23	1	4	73	113			7					1,321	341	12
13	Imports		8					6		3		46	32		4					108	109	13
14	Adjustments, stock change transfer and losses		-1		-23		1	27	-81		57	17		1	-4					10	-6	14
15	Availability		156	50	38		165	1,342	63	576	530	701	68	9	167		537			1,223	5,625	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									11	2	107									120	16
17	ii) By industry									4		8									12	17
18	b) To Non-Energy products											12	34								46	18
19	Net Secondary Energy Supply:		156	50	38		165	1,342	63	561	528	574	34	9	167		537			1,223	5,447	19
20	Total Net Primary and Secondary Energy Supply:	47	156	50	68	-11	165	1,342	63	561	528	574	34	9	167	1,552	568			1,223	7,096	20
	Consumption:																					
21	Transportation: Road				2			1,250		207										2	1,461	21
22	Rail									96											96	22
23	Air													1	138						139	23
24	Marine									49		102									151	24
25	Total				2			1,250		350		102		1	138					2	1,845	25
26	Residential & Farm	3			32			83	44	58	384	8				419	31			334	1,396	26
27	Commercial & Institutional	1			15				10	24	101	71			28	397				261	908	27
28	Industrial	43	156	50	29		155	1	4	138	46	395	33	7		631	537			504	2,729[k]	28
29	Miscellaneous (losses, etc.)				-10	-11	10	8	5	-9	-3	-2	1	1	1	105[j]				122[j]	218	29
30	TOTAL CONSUMPTION	47	156	50	68	-11	165	1,342	63	561	528	574	34	9	167	1,552	568			1,223	7,096	30

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ENERGY SUPPLY & DEMAND CANADA 1981

	PETAJOULES (10^{15})	COAL	COKE	COKE OVEN GAS	LPGs[a]	CRUDE OIL	STILL GAS	GASOLINE	KEROSENE	DIESEL OIL	LIGHT FUEL OIL	HEAVY FUEL OIL	PETROLEUM COKE	AVIATION GAS	AVIATION TURBO FUEL	NATURAL GAS[b]	OTHER FUELS[c]	IMPUTED WATER POWER[d]	IMPUTED NUCLEAR POWER[d]	ELECTRICITY[e]	TOTAL	
	Primary Energy Supply:																					
1	Production	970			315	3,093										2,526	32	1,110	478		8,524	1
2	Exports	464			200	366										803					1,833	2
3	Imports	449				1,138															1,587	3
4	Adjustments, stock change, transfer and losses	-9			-11	14										-13					-19	4
5	Availability	946			104	3,879										1,710	32	1,110	478		8,259	5
	Converted to Secondary Energy																					
	a) To electricity																					
6	i) By utilities	699														44		1,110	478		2,331	6
7	ii) By industry															24					24	7
8	b) To coke, steam	199																			199	8
9	c) To refined products	1			62	3,899										102[f]					4,064	9
10	Net Primary Energy Supply:	47			42	-20										1,540	32				1,641	10
	Secondary Energy Supply:																					
11	Outputs		134	44	76		155	1,276	111	533	472	657	34	8	170		530[g]			1,369	5,569	11
12	Exports		2		16			24		5	60	100			3					127	337	12
13	Imports		9					4		7	1	50	33							5	109	13
14	Adjustments, stock change transfer and losses		-1		-27		-3	44	-58	26	39	-5			-4						11	14
15	Availability		140	44	33		152	1,300	53	561	452	602	67	8	163		530			1,247	5,352	15
	Transformed to other energy:																					
	a) To electricity																					
16	i) By utilities									14	4	70									88	16
17	ii) By industry		4							2		6									8	17
18	b) To Non-Energy products											10	36	8							50	18
19	Net Secondary Energy Supply		136	44	33		152	1,300	53	545	448	516	31	8	163		530			1,247	5,206	19
20	Total Net Primary and Secondary Energy Supply:	47	136	44	75	-20	152	1,300	53	545	448	516	31	8	163	1,540	562			1,247	6,847	20
	Consumption:																					
21	Transportation: Road				2			1,122		211										2	1,337	21
22	Rail									91											91	22
23	Air														131						131	23
24	Marine									43		105									148	24
25	Total				2			1,122		345		105			131					2	1,707	25
26	Residential & Farm	4			30			79	35	59	302	6				431	32			346	1,324	26
27	Commercial & Institutional	1			16			89	7	26	98	61			29	356				274	956	27
28	Industrial	42	136	44	28		147		3	132	38	348	31	7		653	530			529	2,669[k]	28
29	Miscellaneous (losses, etc.)				-1	-20	5	10	8	-17	10	-4		1	3	100[j]				96[j]	191	29
30	TOTAL CONSUMPTION	47	136	44	75	-20	152	1,300	53	545	448	516	31	8	163	1,540	562			1,247	6,847	30

Environment Canada / Environnement Canada

ENERGY SUPPLY-DEMAND TABLE

Notes:

a) LPGs (Liquified Petroleum Gases) are the hydrocarbons ethane, propane and butane. Supplies produced from gas plants and petroleum refineries are assigned to primary and secondary supplies respectively. This somewhat arbitrary division is in keeping with the designation of crude oil as a primary raw material (and the derived products as secondary supplies).

b) Natural gas production statistics for the years 1971-1977 cover supplies of raw natural gas while for years beginning in 1978, they refer to 'marketable gas' (after extraction of LPGs, sulphur, etc.). Requisite data are not readily available for the reconciliation of the time-series.

c) The Other Fuels column does not appear in the sources quoted. Data were obtained for self-produced energy in the industrial sector from Energy, Mines and Resources Publication #3a of the Industry Series. Conversion factors have been applied to estimated fuel wood production. (Logging SC 25-201).

d) Inputed Power comprises the operating input required to produce measured electricity output: viz., water power 4000 BTU input/3412 BTU output, nuclear power 12000 BTU average input/3412 BTU output. Conversion losses are due to friction, transformation efficiency, etc.

e) Data for electricity generated are obtained from Electric Power Statistics, Vo. II.

f) This value refers to the supply of natural gas that is consumed by the chemical industry for use as petrochemical feedstock. A full-time series is published by Statistics Canada (Catalogue 46-219).

g) Other Fuels output by manufacturing industries includes biomass (pulp liquors and wood waste) and self-developed electricity which is used within the industry.

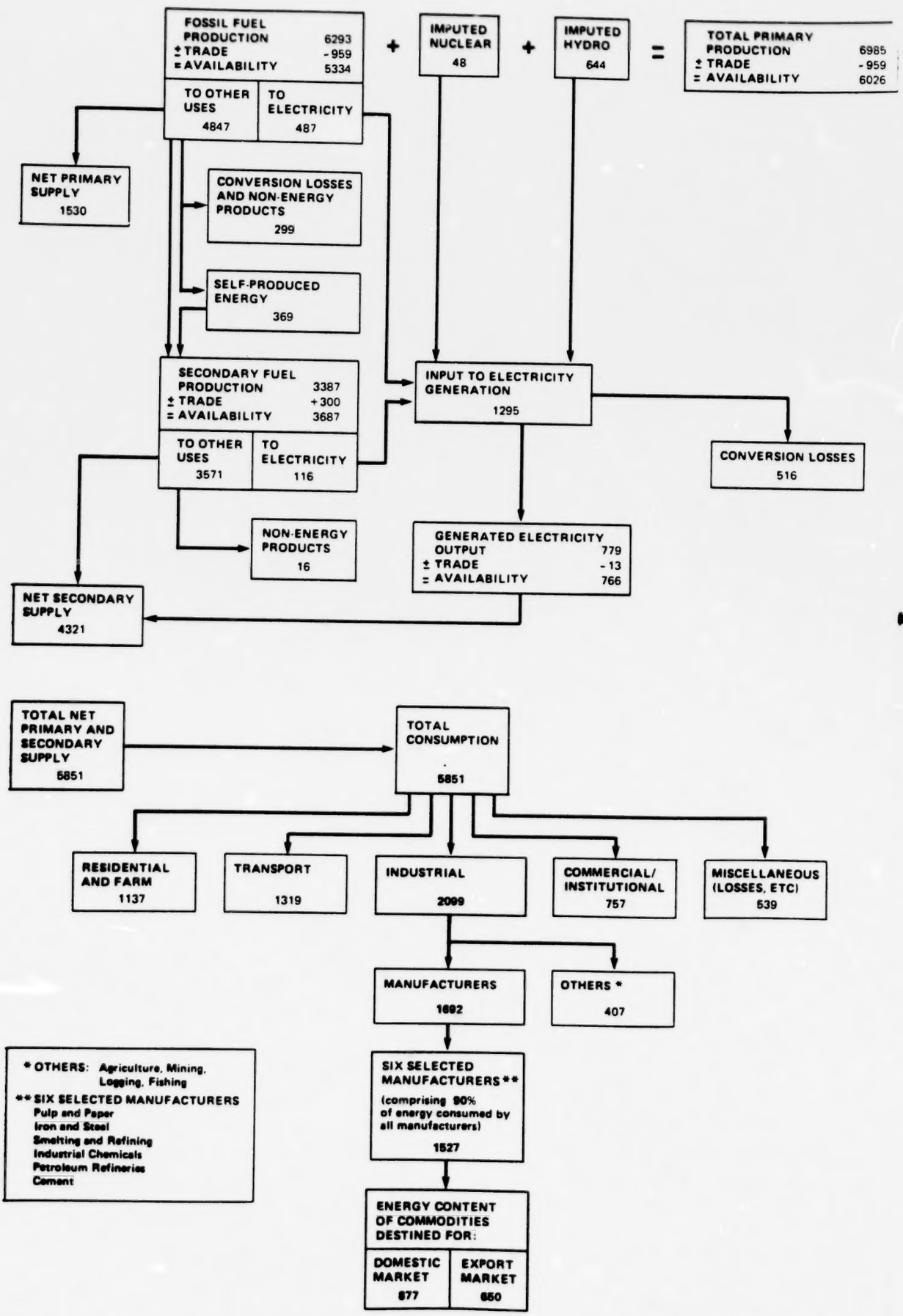
h) The miscellaneous natural gas use includes pipeline fuel. However, for the years 1971-1977 it cannot be estimated from energy used for natural gas processing.

j) Miscellaneous use of electricity includes transmission losses and utility use to ensure informity within this time series.

k) The total industrial consumption of fuels and electricity is greater than that indicated in the Quarterly report on energy supply-demand in Canada (SC 57-003) since this analysis explicitly includes self-produced energy.

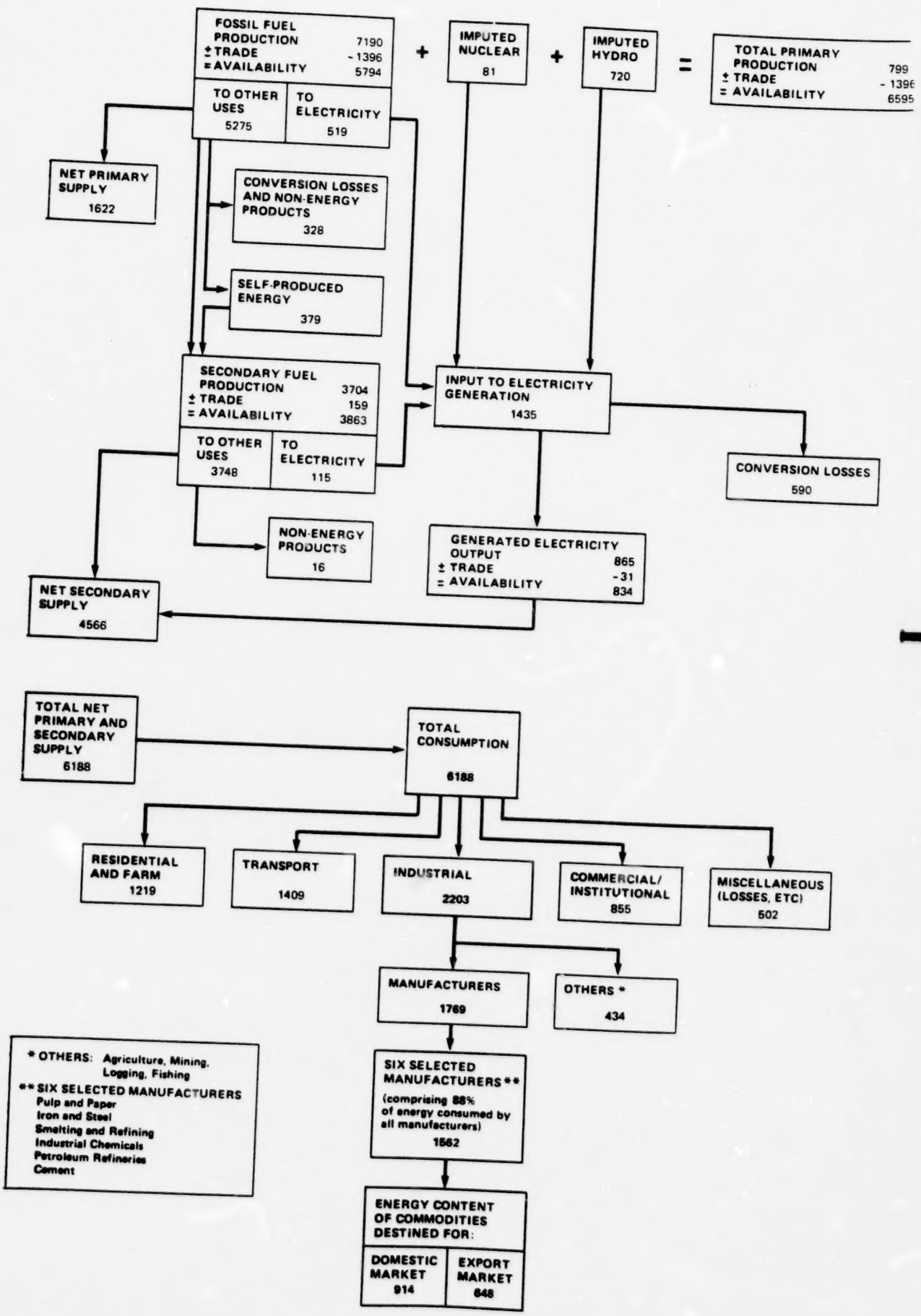
FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1971

(ALL FIGURES IN PETAJOULES)



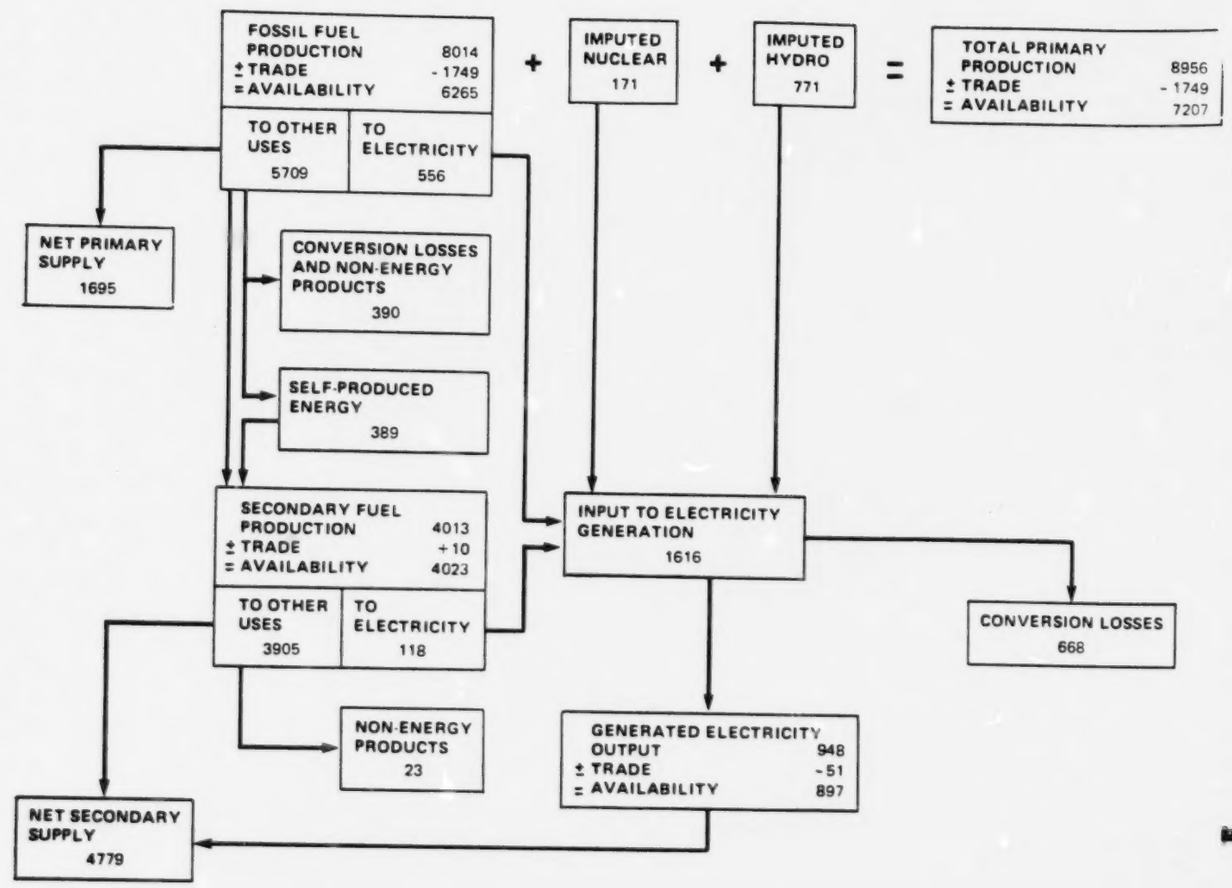
FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1972

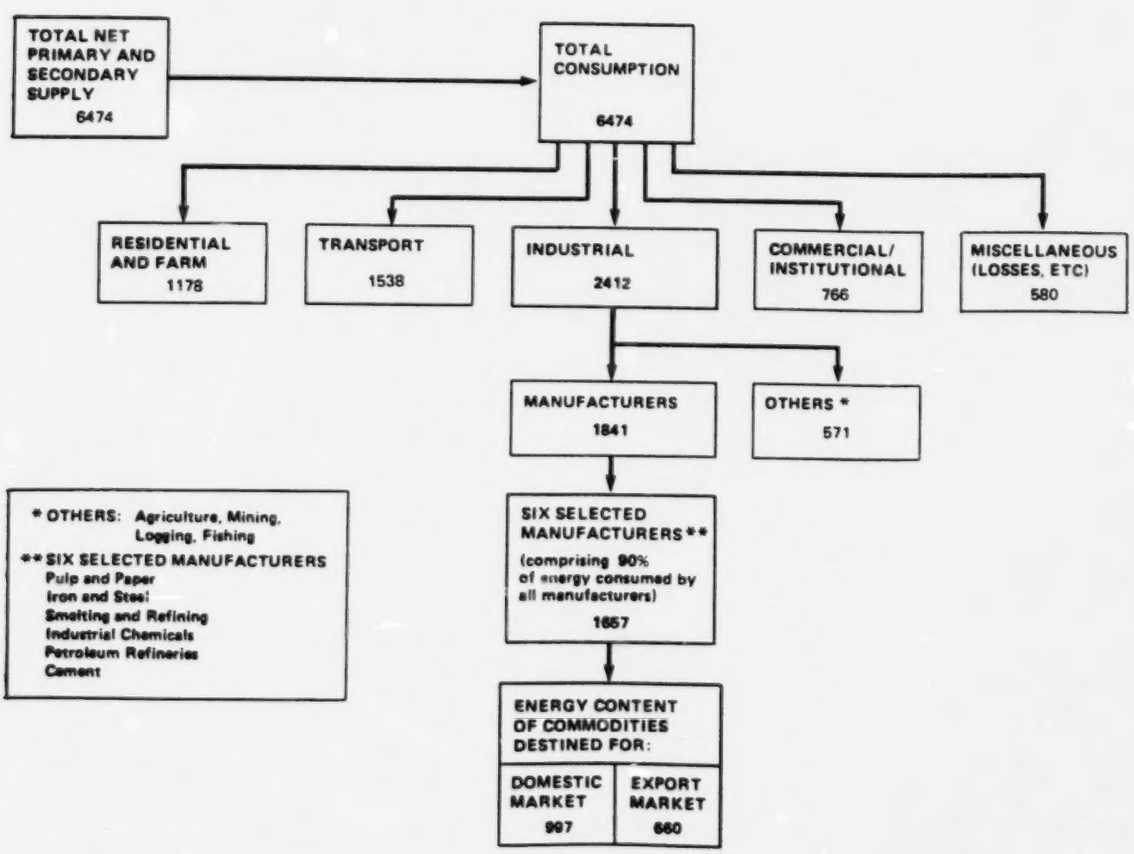
(ALL FIGURES IN PETAJOULES)



FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1973

(ALL FIGURES IN PETAJOULES)



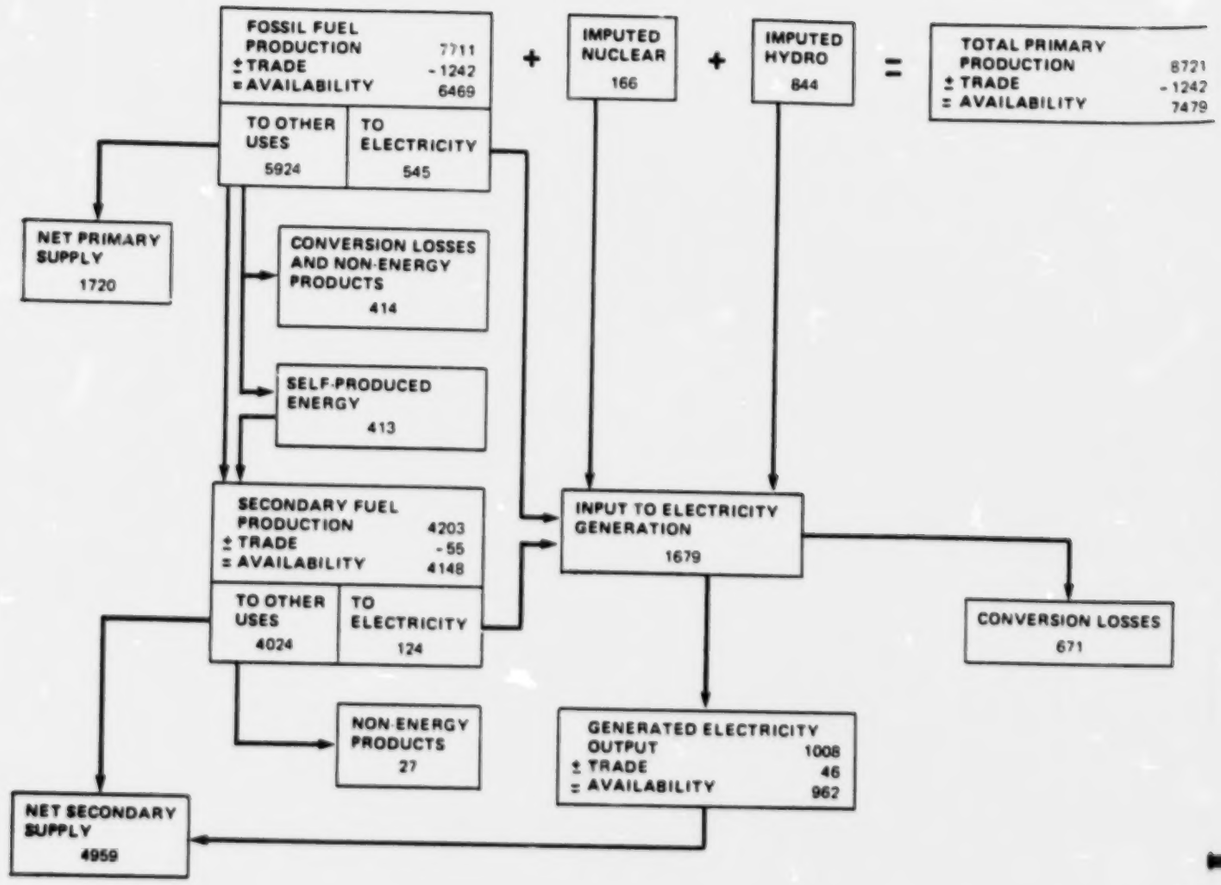

TOTAL NET PRIMARY AND SECONDARY SUPPLY 6474
TOTAL CONSUMPTION 6474
RESIDENTIAL AND FARM 1178
TRANSPORT 1538
INDUSTRIAL 2412
COMMERCIAL/ INSTITUTIONAL 766
MISCELLANEOUS (LOSSES, ETC) 580
MANUFACTURERS 1841
OTHERS * 571
SIX SELECTED MANUFACTURERS ** (comprising 90% of energy consumed by all manufacturers) 1657
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 997
EXPORT MARKET 660

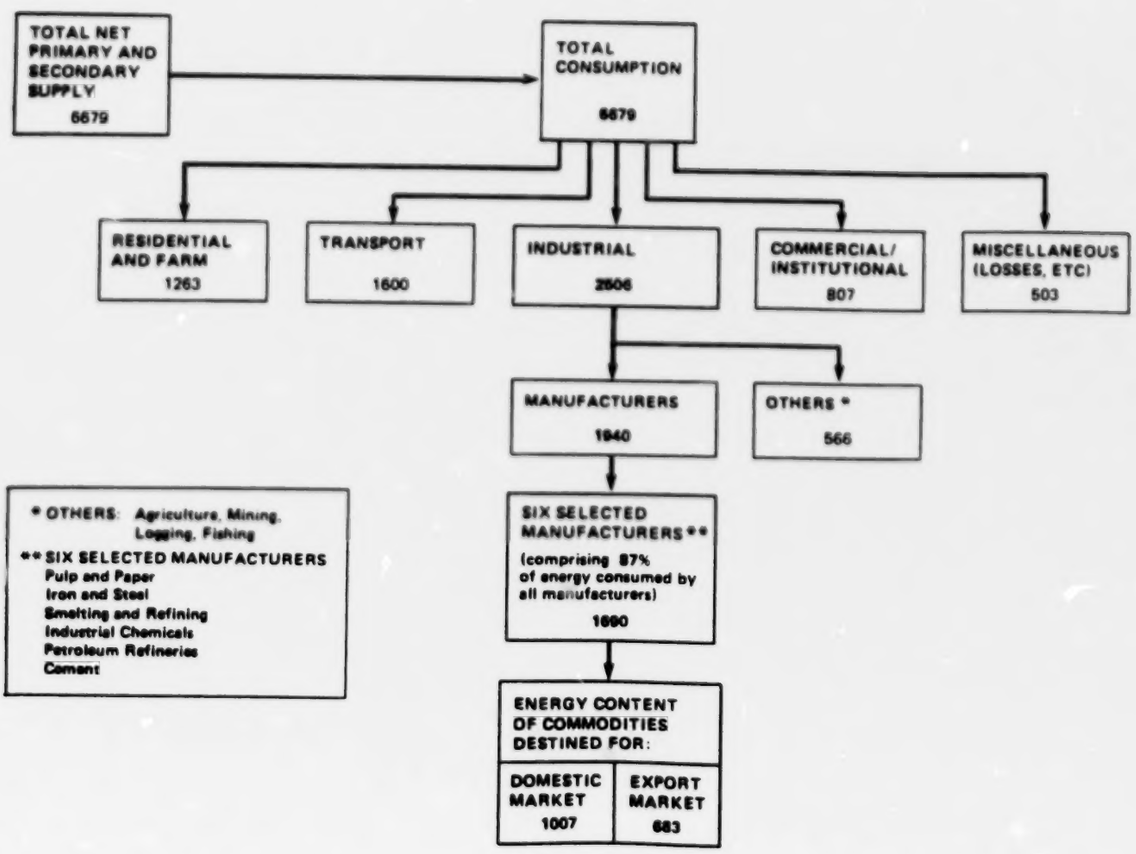
* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
Pulp and Paper
Iron and Steel
Smelting and Refining
Industrial Chemicals
Petroleum Refineries
Cement

FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1974

(ALL FIGURES IN PETAJOULES)



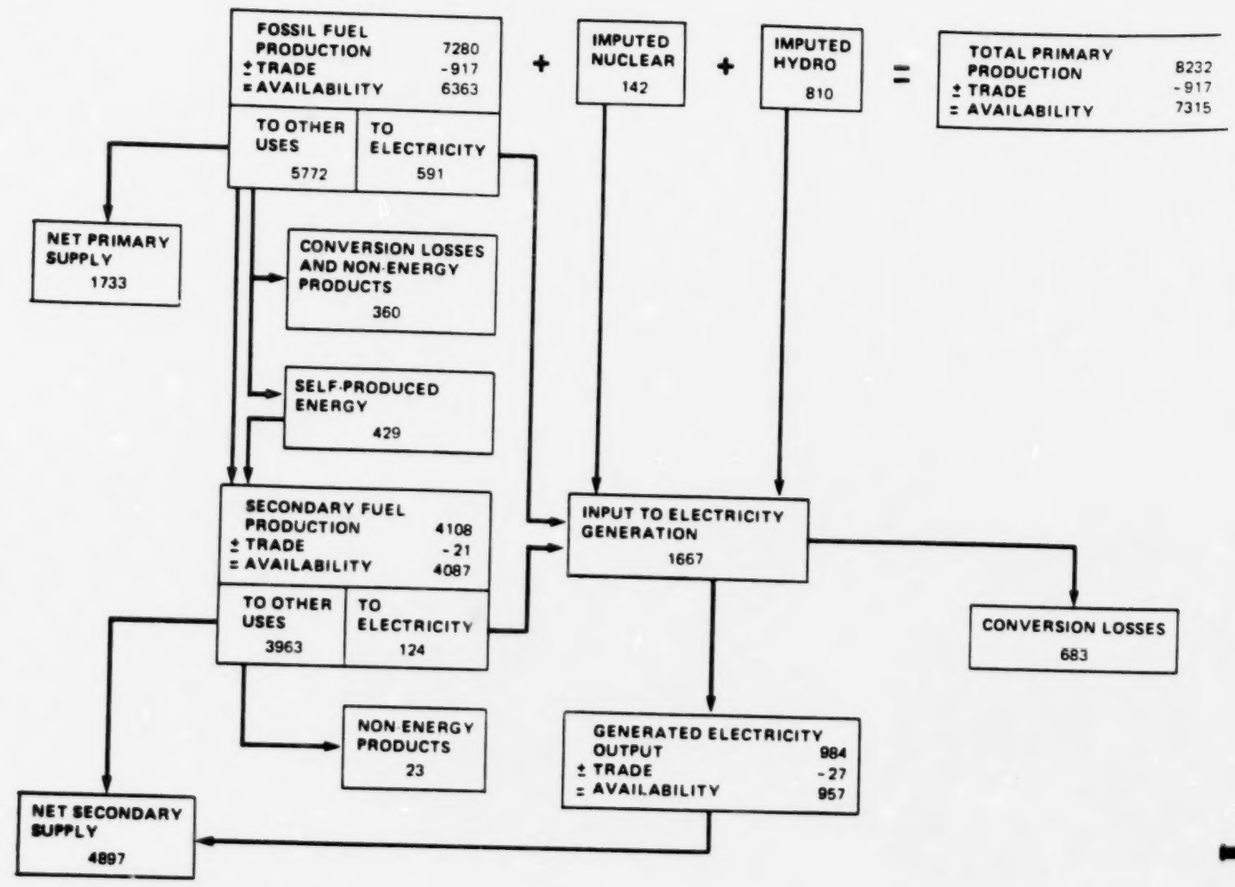

TOTAL NET PRIMARY AND SECONDARY SUPPLY 6679
TOTAL CONSUMPTION 6679
RESIDENTIAL AND FARM 1263
TRANSPORT 1600
INDUSTRIAL 2506
COMMERCIAL/ INSTITUTIONAL 807
MISCELLANEOUS (LOSSES, ETC) 503
MANUFACTURERS 1940
OTHERS * 566
SIX SELECTED MANUFACTURERS ** (comprising 87% of energy consumed by all manufacturers) 1690
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 1007
EXPORT MARKET 683

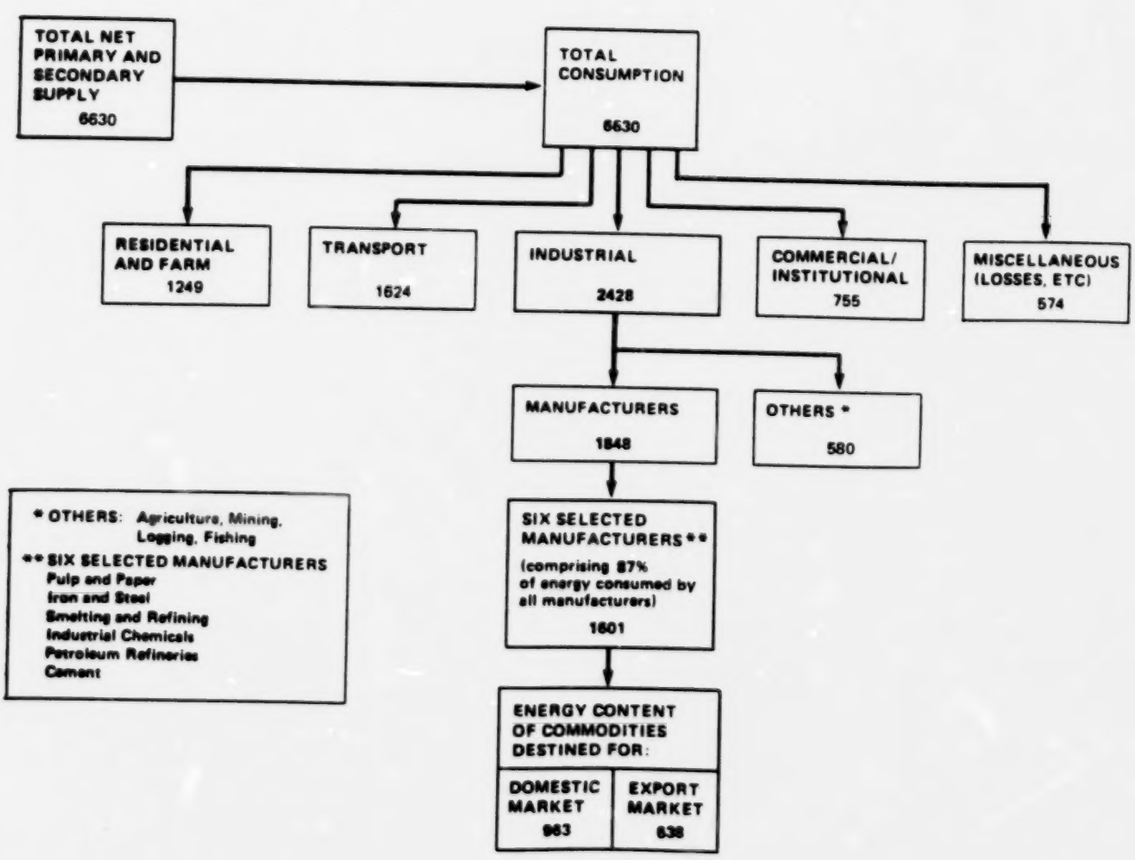
* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
- Pulp and Paper
- Iron and Steel
- Smelting and Refining
- Industrial Chemicals
- Petroleum Refineries
- Cement

FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1975

(ALL FIGURES IN PETAJOULES)



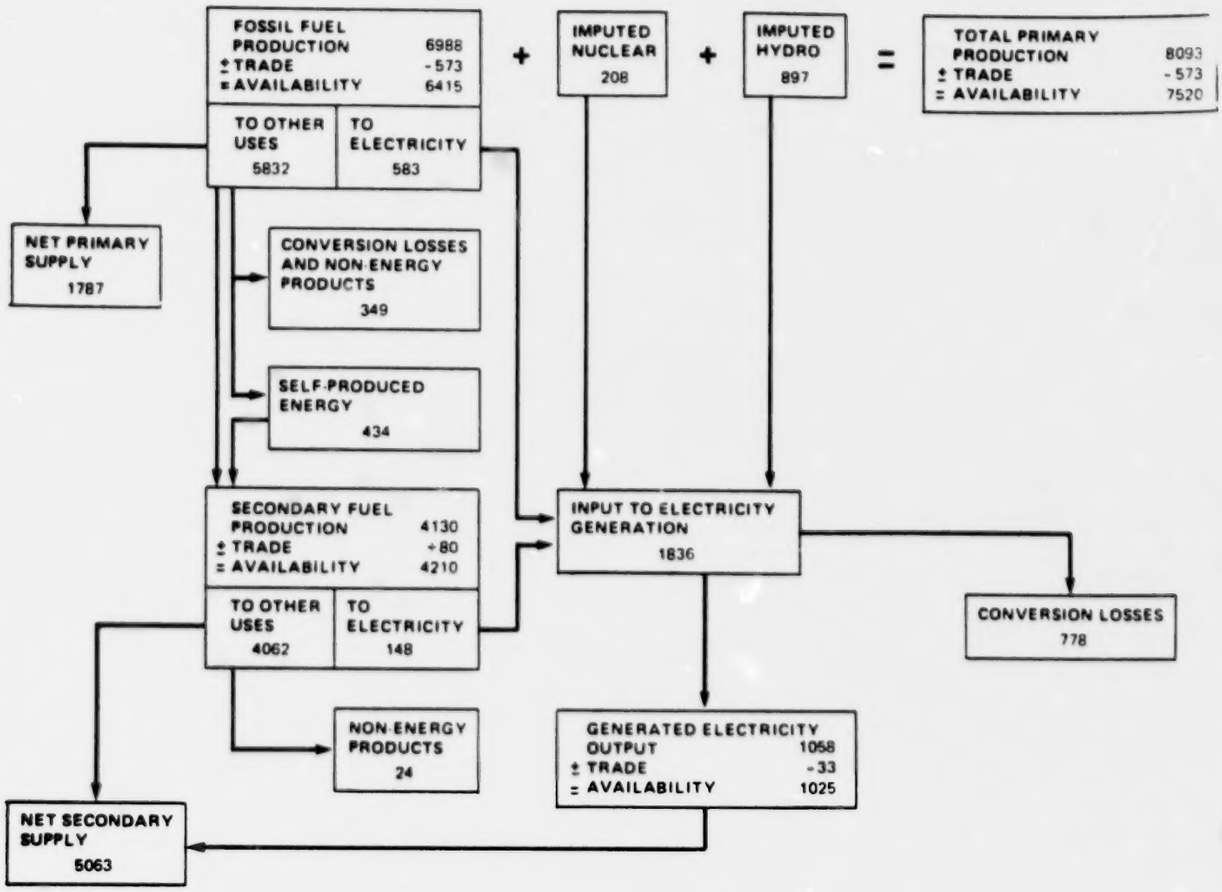

TOTAL NET PRIMARY AND SECONDARY SUPPLY 6630
TOTAL CONSUMPTION 6630
RESIDENTIAL AND FARM 1249
TRANSPORT 1624
INDUSTRIAL 2428
COMMERCIAL/ INSTITUTIONAL 755
MISCELLANEOUS (LOSSES, ETC) 574
MANUFACTURERS 1848
OTHERS * 580
SIX SELECTED MANUFACTURERS ** (comprising 87% of energy consumed by all manufacturers) 1601
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 963
EXPORT MARKET 638

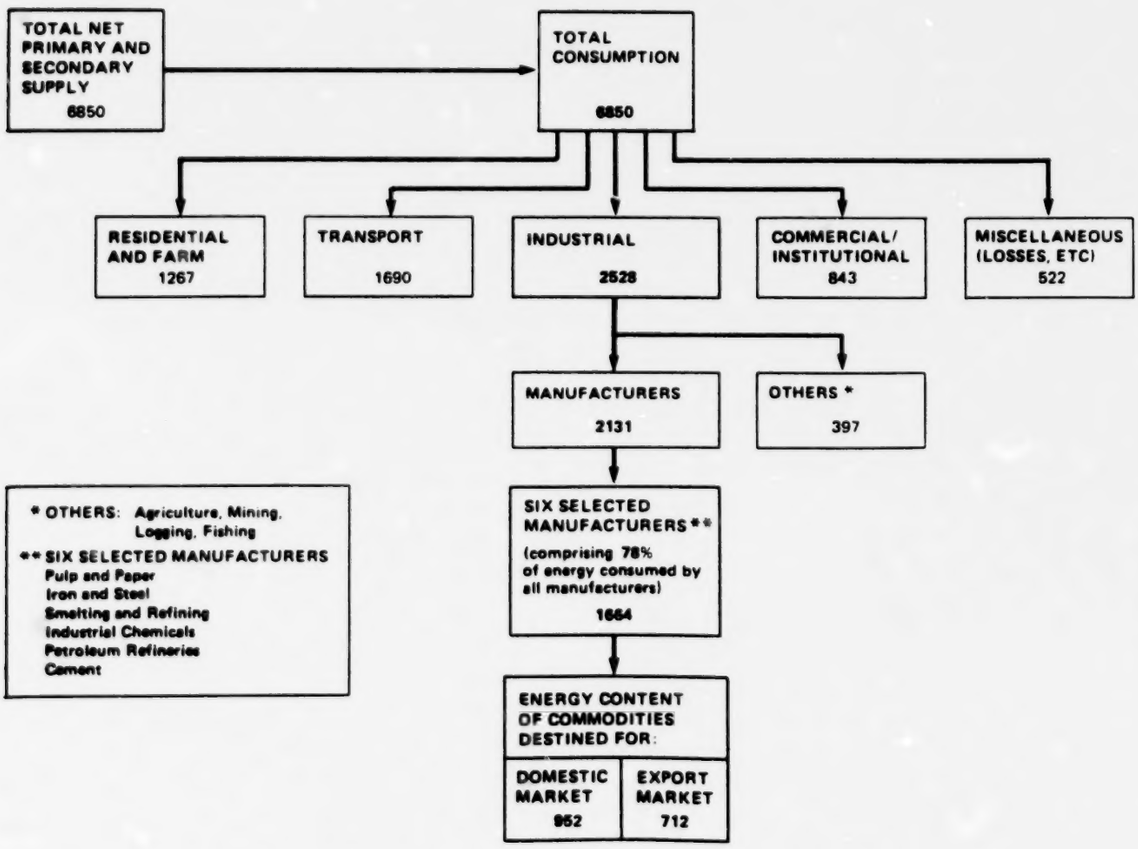
* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
Pulp and Paper
Iron and Steel
Smelting and Refining
Industrial Chemicals
Petroleum Refineries
Cement

FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1976

(ALL FIGURES IN PETAJOULES)



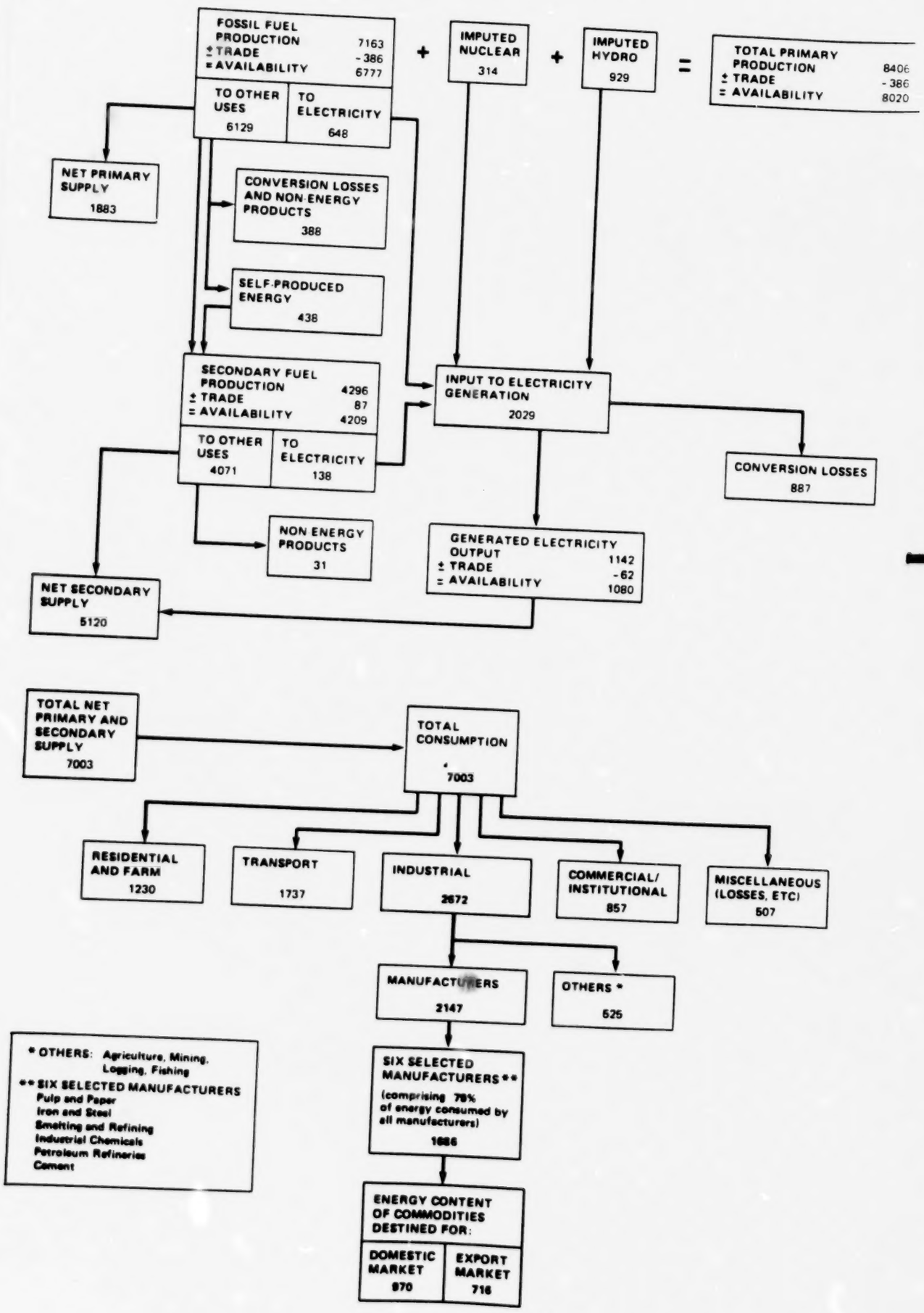

TOTAL NET PRIMARY AND SECONDARY SUPPLY 6850
TOTAL CONSUMPTION 6850
RESIDENTIAL AND FARM 1267
TRANSPORT 1690
INDUSTRIAL 2528
COMMERCIAL/ INSTITUTIONAL 843
MISCELLANEOUS (LOSSES, ETC) 522
MANUFACTURERS 2131
OTHERS * 397
SIX SELECTED MANUFACTURERS ** (comprising 78% of energy consumed by all manufacturers) 1664
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 952
EXPORT MARKET 712

* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
- Pulp and Paper
- Iron and Steel
- Smelting and Refining
- Industrial Chemicals
- Petroleum Refineries
- Cement

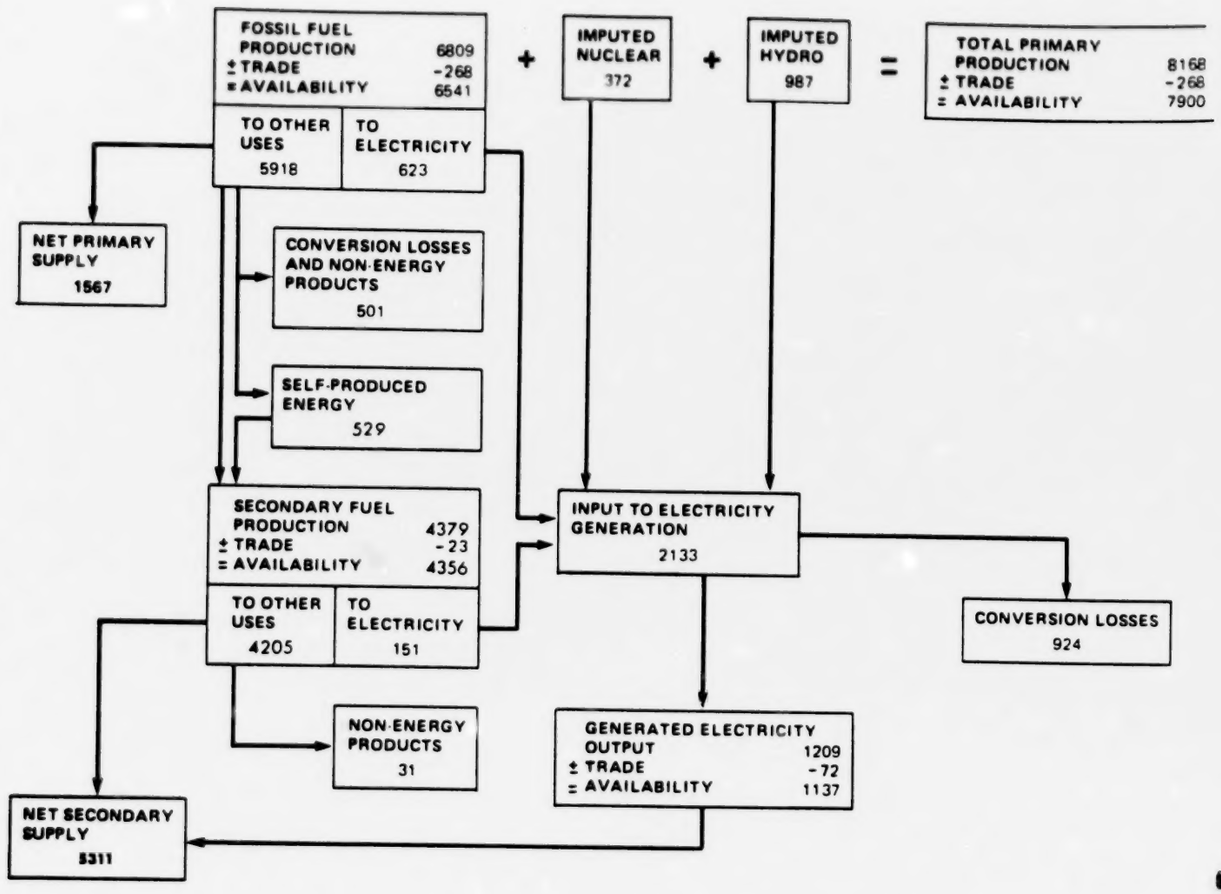
FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1977

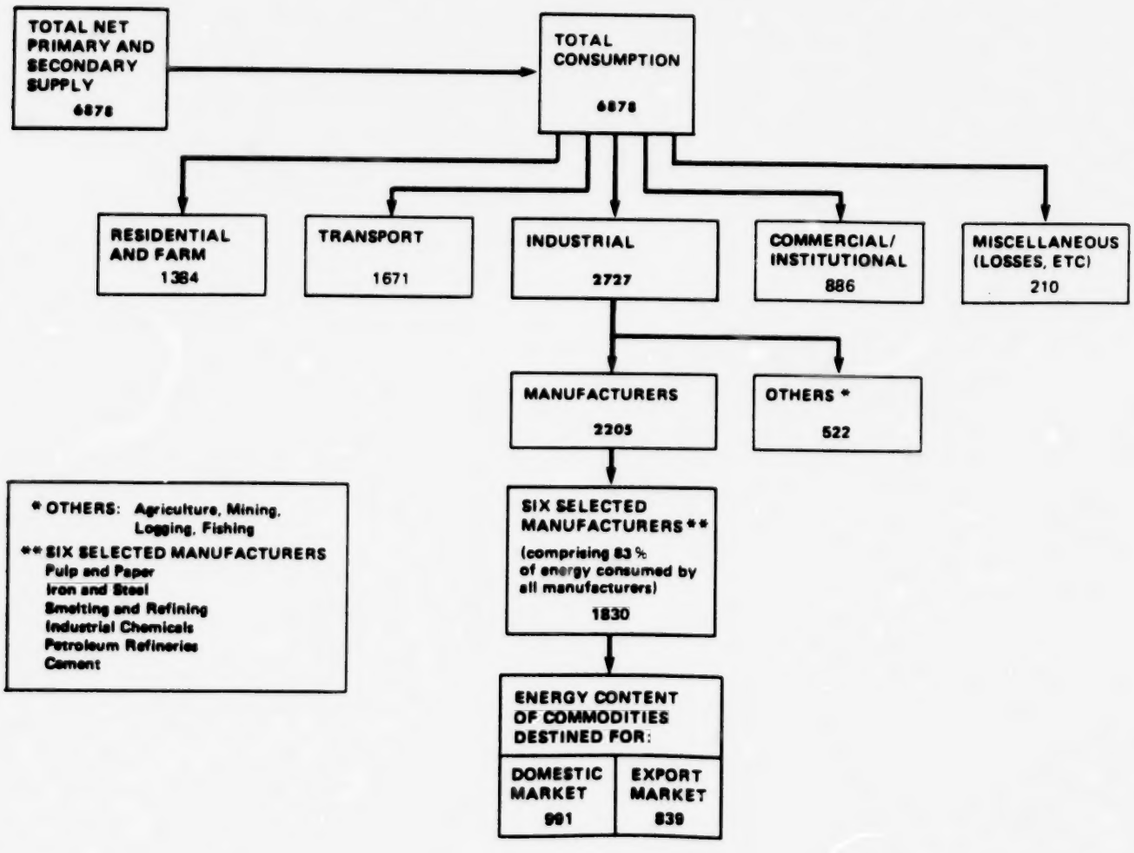
(ALL FIGURES IN PETAJOULES)



FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1978

(ALL FIGURES IN PETAJOULES)



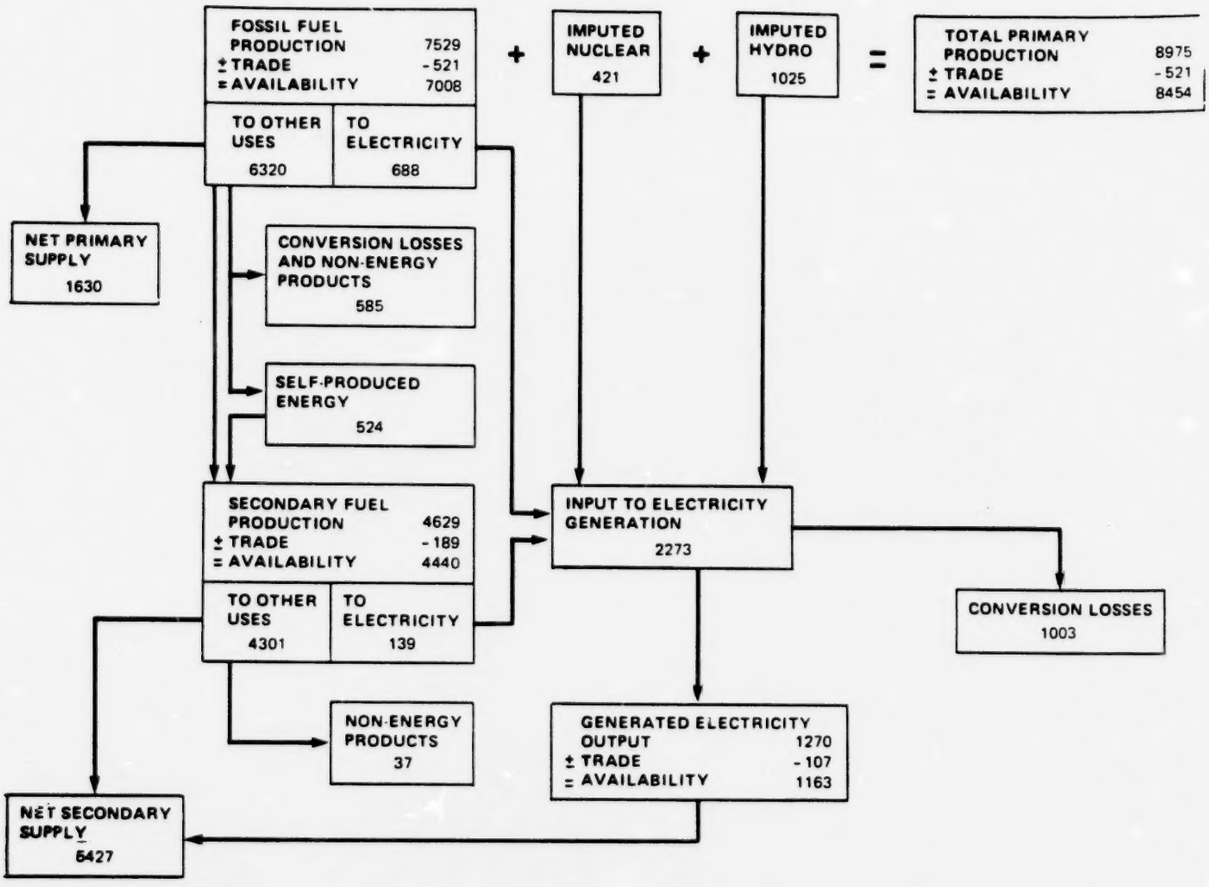

TOTAL NET PRIMARY AND SECONDARY SUPPLY 6878
TOTAL CONSUMPTION 6878
RESIDENTIAL AND FARM 1384
TRANSPORT 1671
INDUSTRIAL 2727
COMMERCIAL/ INSTITUTIONAL 886
MISCELLANEOUS (LOSSES, ETC) 210
MANUFACTURERS 2205
OTHERS * 522
SIX SELECTED MANUFACTURERS ** (comprising 83% of energy consumed by all manufacturers) 1830
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 991
EXPORT MARKET 839

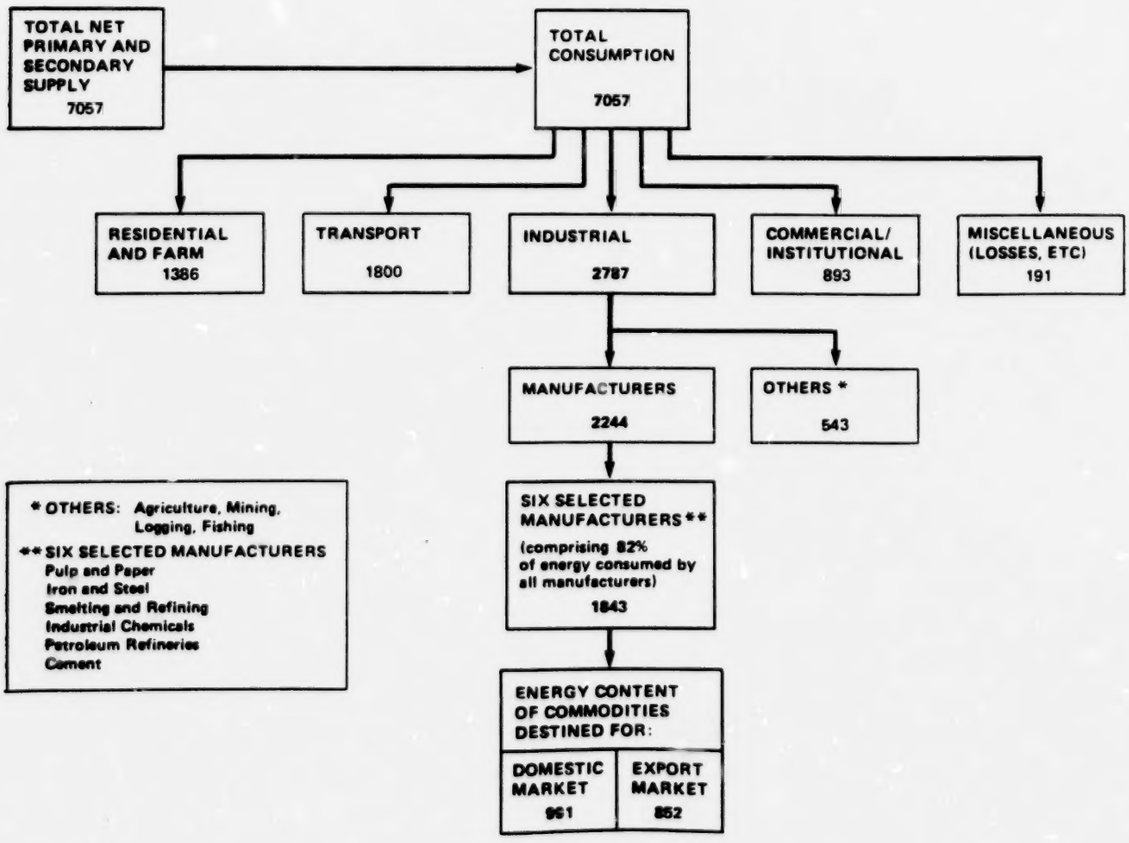
* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
Pulp and Paper
Iron and Steel
Smelting and Refining
Industrial Chemicals
Petroleum Refineries
Cement

FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1979

(ALL FIGURES IN PETAJOULES)



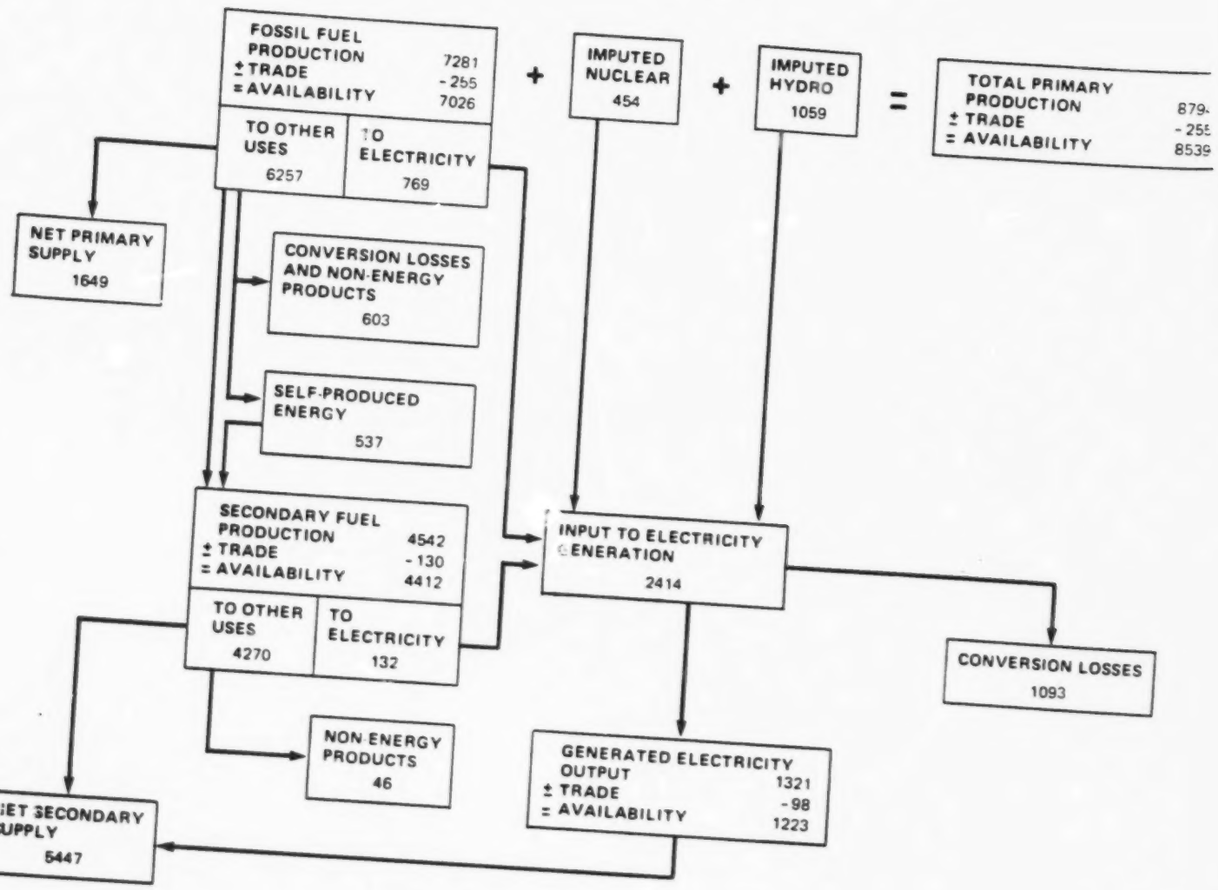

TOTAL NET PRIMARY AND SECONDARY SUPPLY 7057
TOTAL CONSUMPTION 7057
RESIDENTIAL AND FARM 1386
TRANSPORT 1800
INDUSTRIAL 2787
COMMERCIAL/ INSTITUTIONAL 893
MISCELLANEOUS (LOSSES, ETC) 191
MANUFACTURERS 2244
OTHERS * 543
SIX SELECTED MANUFACTURERS ** (comprising 82% of energy consumed by all manufacturers) 1843
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 991
EXPORT MARKET 852

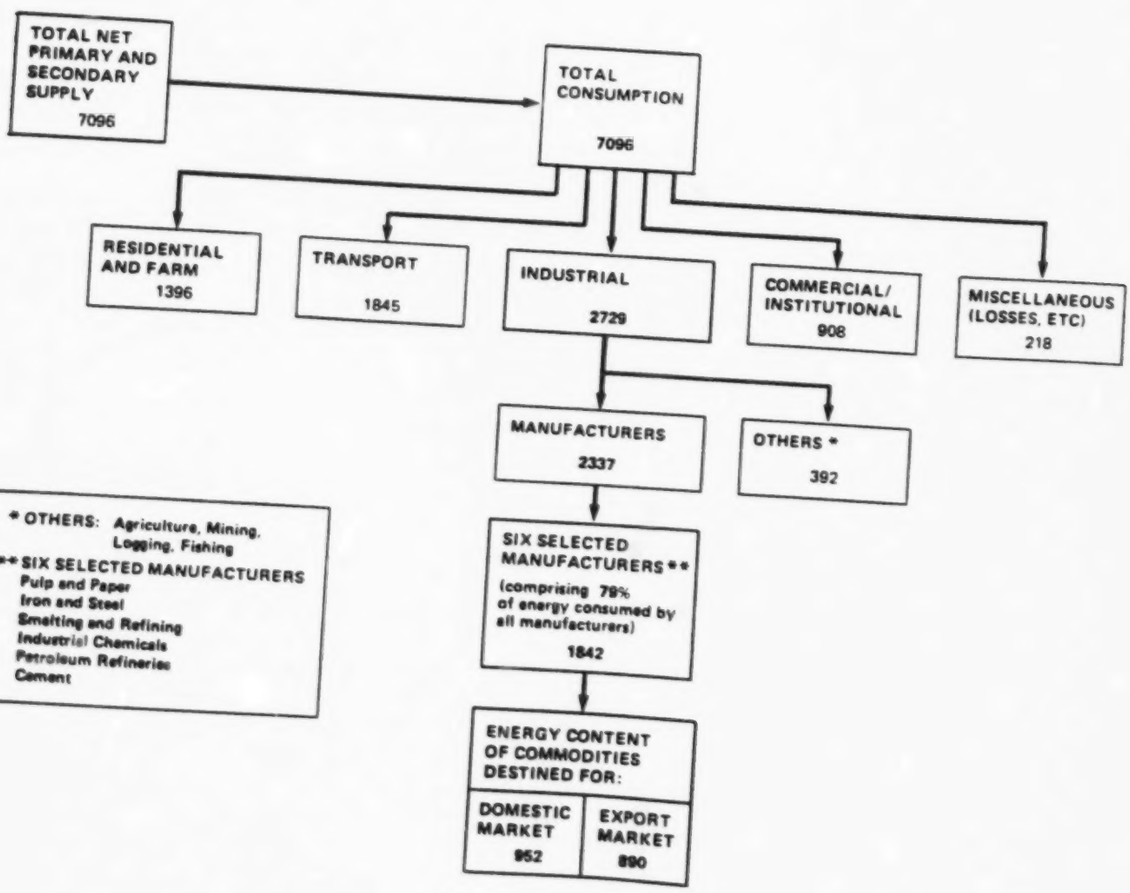
* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
Pulp and Paper
Iron and Steel
Smelting and Refining
Industrial Chemicals
Petroleum Refineries
Cement

FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1980

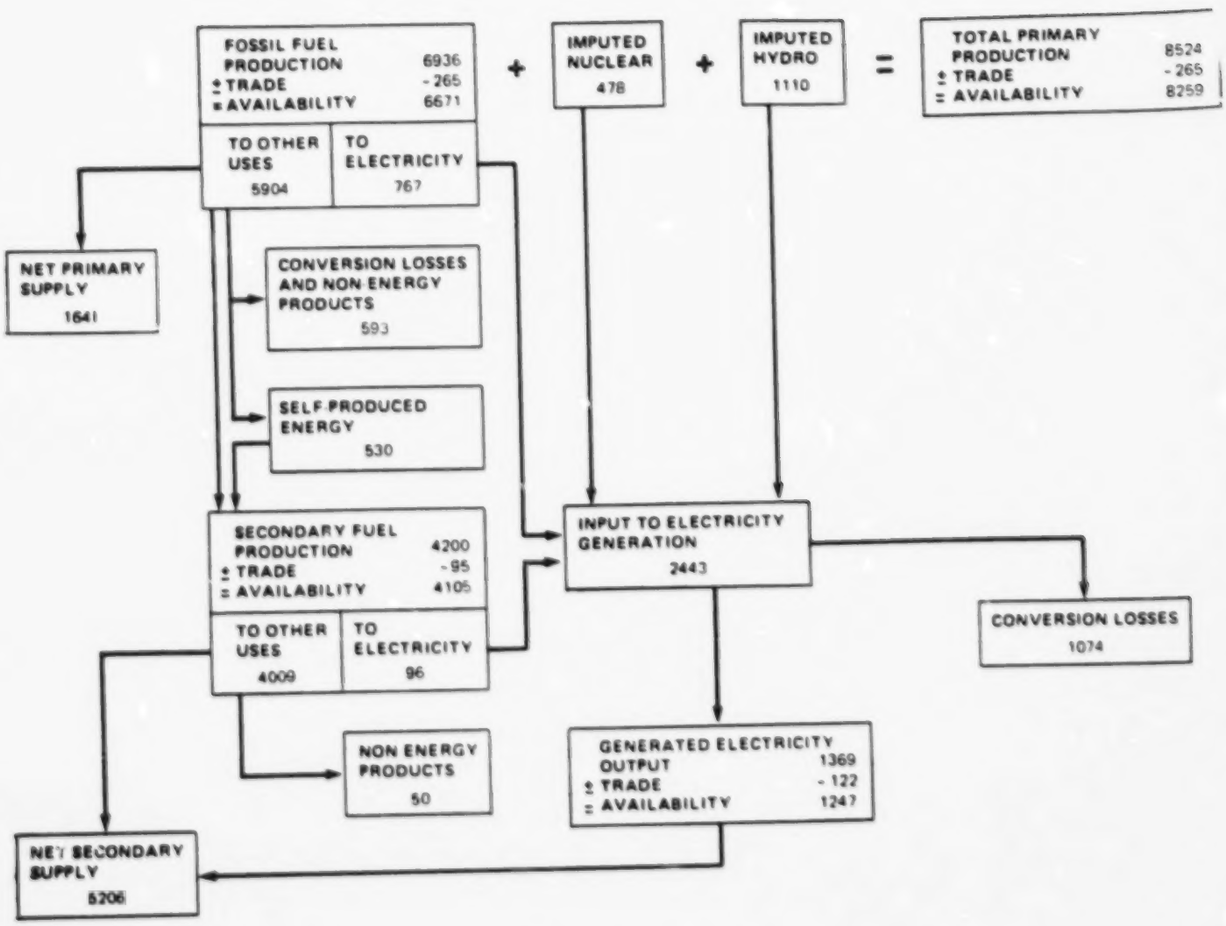
(ALL FIGURES IN PETAJOULES)

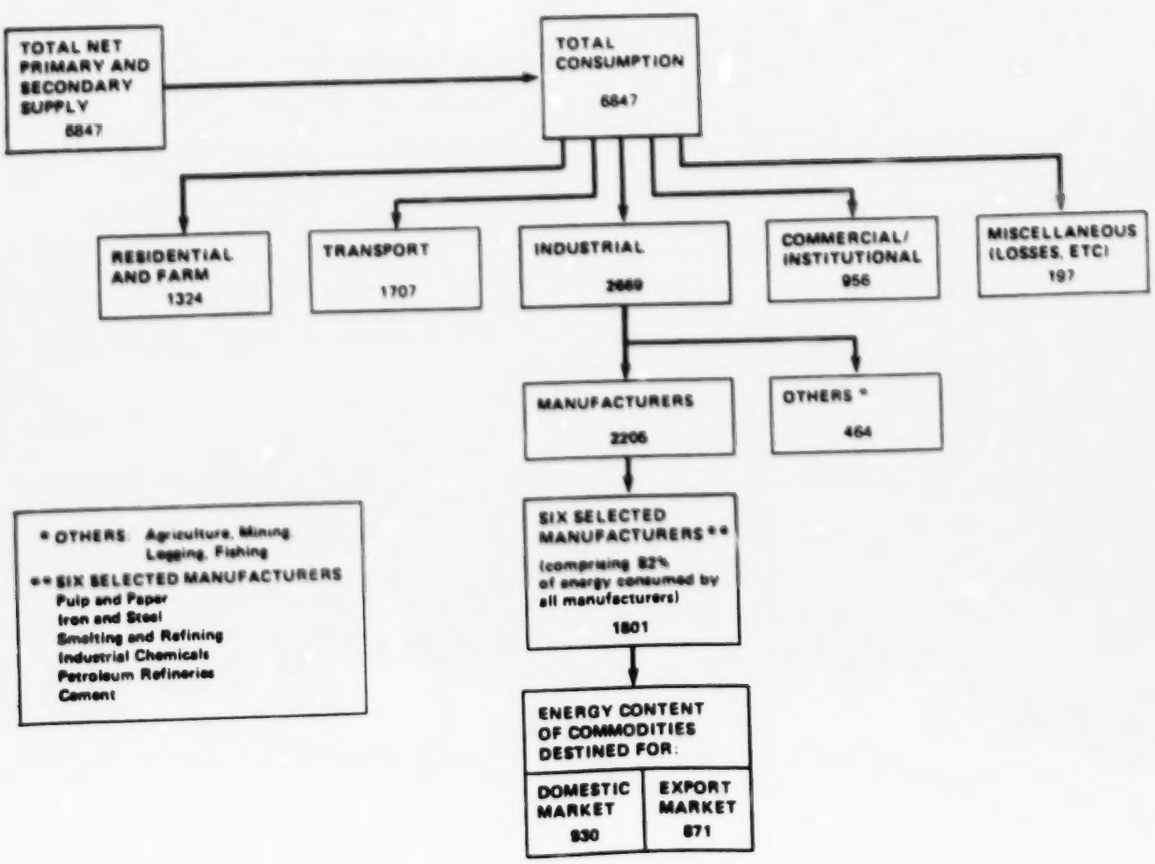




FLOW DIAGRAM OF ENERGY SUPPLY AND CONSUMPTION IN THE CANADIAN DOMESTIC MARKET IN 1981

(ALL FIGURES IN PETAJOULES)




TOTAL NET PRIMARY AND SECONDARY SUPPLY 6847
TOTAL CONSUMPTION 6847
RESIDENTIAL AND FARM 1324
TRANSPORT 1707
INDUSTRIAL 2669
COMMERCIAL/ INSTITUTIONAL 956
MISCELLANEOUS (LOSSES, ETC) 197
MANUFACTURERS 2206
OTHERS * 464
SIX SELECTED MANUFACTURERS ** (comprising 82% of energy consumed by all manufacturers) 1801
ENERGY CONTENT OF COMMODITIES DESTINED FOR:
DOMESTIC MARKET 930
EXPORT MARKET 871

* OTHERS: Agriculture, Mining, Logging, Fishing

** SIX SELECTED MANUFACTURERS
- Pulp and Paper
- Iron and Steel
- Smelting and Refining
- Industrial Chemicals
- Petroleum Refineries
- Cement

CANADA 1971

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	233	2832	1273	2001	360	222	582	171	411	71
Iron and Steel	185[1]	1764	867	306	291[5]	1	292	241	51	17
Smelting & Refining	95	1968[3]	1467	1203	114	103	217	85	132	61
Industrial Chemicals	90	952	439	305	119	18	137	93	44	32
Petroleum Refineries	20	2089	419	53	16	216	232[6]	226	6	2.5
Cement	28	193	131	16	67	–	67	61	6	9
Total Selected Manufactures	651	9798	4596	3884	967	560	1527	877	650	43
Percentage of Total Manufactures	58%	19%	21%	31%	87%	96%	90%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	1118	50276	21738	12724	1110	582	1692	n.a.	n.a.	n.a.
Percentage of Total Industry	80%	n.a.	n.a.	80%	73%	99%	81%	n.a.	n.a.	n.a.
Percentage of GNP			23%							
Total Industry[8]	1402	n.a.	n.a.	15820	1514	585	2099[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by products. It does not include metallurgical coke.

CANADA 1972

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars				Energy (Petajoules)					
	Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Energy Content of[7] Commodities Destined for: Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	244	3128	1374	2132	366	288	594	189	405	68%
Iron and Steel	205[2]	1901	909	310	297[5]	1	298	249	49	16
Smelting & Refining	88	1979[3]	1532	1194[4]	110	104	214	85	129	60
Industrial Chemicals	93	967	444	318	121	20	141	95	46	33
Petroleum Refineries	23	2412	451	126	18	228	246[6]	234	12	5
Cement	32	221	156	23	69	–	69	62	7	10
Total Selected Manufactures	685	10808	4866	4103	981	581	1562	914	648	41%
Percentage of Total Manufactures	57%	19%	20%	28%	84%	96%	88%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	1209	58191	24286	14503	1165	604	1769	n.a.	n.a.	n.a.
Percentage of Total Industry	80%	n.a.	n.a.	81%	73%	99%	80%	n.a.	n.a.	n.a.
Percentage of GNP			23%							
Total Industry[8]	1515	n.a.	n.a.	17813	1596	607	2203	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by products. It does not include metallurgical coke.

CANADA 1973

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars				Energy (Petajoules)					
	Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Energy Content of[7] Commodities Destined for: Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	271	3791	1804	2550	373	232	605	198	407	67%
Iron and Steel	258[2]	2318	1155	338	331[5]	1	332	284	48	14
Smelting & Refining	100	2473[3]	1965	1444[4]	112	105	217	90	127	59
Industrial Chemicals	113	1197	589	396	138	24	162	108	54	33
Petroleum Refineries	26	3034	559	191	20	249	269[6]	252	17	6
Cement	39	254	172	24	72	–	72	65	7	9
Total Selected Manufactures	807	13067	6224	4943	1046	611	1657	997	660	40%
Percentage of Total Manufactures	58%	20%	22%	28%	87%	96%	90%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	1383	66674	28716	17749	1206	635	1841	n.a.	n.a.	n.a.
Percentage of Total Industry	79%	n.a.	n.a.	80%	68%	99%	76%	n.a.	n.a.	n.a.
Percentage of GNP			23%							
Total Industry[8]	1758	n.a.	n.a.	22186	1774	638	2412[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

CANADA 1974

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	409	5703	3034	3898	370	241	611	193	418	68%
Iron and Steel	408[2]	3036	1385	501	334[5]	1	335	280	28055	16
Smelting & Refining	118	3140[3]	2483	1776[4]	106	108	214	93	121	57
Industrial Chemicals	148	1635	794	557	150	44	194	128	66	34
Petroleum Refineries	34	5130	946	351	23	247	270[6]	252	18	7
Cement	61	298	190	24	66	–	66	61	5	8
Total Selected Manufactures	1178	18942	8832	7107	1049	641	1690	1007	683	40%
Percentage of Total Manufactures	62%	23%	25%	35%	82%	98%	87%	n.a.	n.a.	n.a.
Percentage of GNP			6%							
Total Manufactures	1906	82455	35084	20588	1283	657	1940	n.a.	n.a.	n.a.
Percentage of Total Industry	80%	n.a.	n.a.	74%	70%	99%	77%	n.a.	n.a.	n.a.
Percentage of GNP			24%							
Total Industry[8]	2380	n.a.	n.a.	27993	1846	660	2506[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

CANADA 1975

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars				Energy (Petajoules)					
	Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Energy Content of[7] Commodities Destined for: Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	399	5122	2569	3773	301	256	557	147	410	74%
Iron and Steel	546[2]	3148	1348	446	308[5]	1	309	265	44	14
Smelting & Refining	141	3056[3]	2350	1574[4]	100	107	207	101	106	52
Industrial Chemicals	173	1858	842	576	137	53	190	131	59	31
Petroleum Refineries	47	5867	819	312	24	246	270[6]	256	14	5
Cement	73	339	210	23	68	–	68	63	5	7
Total Selected Manufactures	1379	19390	8138	6704	938	663	1601	963	638	40%
Percentage of Total Manufactures	62%	22%	23%	32%	80%	98%	87%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	2212	88427	36105	21149	1175	673	1848	n.a.	n.a.	n.a.
Percentage of Total Industry	81%	n.a.	n.a.	73%	67%	99.9%	76%	n.a.	n.a.	n.a.
Percentage of GNP			22%							
Total Industry[8]	2726	n.a.	n.a.	28902	1753	675	2428[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

CANADA 1976

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	546	5993	2845	4424	352	265	617	162	455	74%
Iron and Steel	607[2]	3460	1469	566	318[5]	1	319	267	52	16
Smelting & Refining	157	3147[3]	2485	1993[4]	93	102	195	72	123	63
Industrial Chemicals	273	2221	935	806	139	58	197	126	71	36
Petroleum Refineries	62	6831	976	192	25	246	271[6]	264	7	3
Cement	84	404	250	24	65	–	65	61	4	6
Total Selected Manufactures	1729	22056	8960	7995	992	672	1664	952	712	43%
Percentage of Total Manufactures	63%	22%	22%	31%	68%	99%	78%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	2758	98281	39922	25756	1453	678	2131	n.a.	n.a.	n.a.
Percentage of Total Industry	82%	n.a.	n.a.	76%	78%	99%	84%	n.a.	n.a.	n.a.
Percentage of GNP			21%							
Total Industry[8]	3375	n.a.	n.a.	33921	1848	680	2528[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

CANADA 1977

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars				Energy (Petajoules)					
	Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Purchased Energy	Self Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Energy Content of[7] Commodities Destined for: Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	668	6837	3056	4837	342	256	598	162	436	73%
Iron and Steel	649[2]	3844	1683	751	311[5]	1	312	251	61	20
Smelting & Refining	179	3956[3]	2641	2241[4]	90	110	200	74	126	63
Industrial Chemicals	324	2566	949	1003	144	62	206	125	81	49
Petroleum Refineries	85	8443	1231	154	43	267	310[6]	304	6	2
Cement	95	436	272	40	60	–	60	54	6	10
Total Selected Manufactures	2000	25482	9832	9026	990	696	1686	970	716	
Percentage of Total Manufactures	62%	23%	22%	29%	69%	99%	79%	n.a.	n.a.	42%
Percentage of GNP			5%							n.a.
Total Manufactures	3210	108852	44110	31057	1445	702	2147	n.a.	n.a.	n.a.
Percentage of Total Industry	82%	n.a.	n.a.	78%	73%	99%	80%	n.a.	n.a.	n.a.
Percentage of GNP			21%							
Total Industry[8]	3917	n.a.	n.a.	39716	1967	705	2672[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

CANADA 1978

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	798	7649	3504	5452	350	288	638	183	455	71%
Iron and Steel	797[2]	4960	2082	1050	319[5]	1	320	251	69	22
Smelting & Refining	202	3800[3]	2775	2826[4]	91	116	207	53	154	74
Industrial Chemicals	441	3010	1173	1470	166	115	281	144	137	49
Petroleum Refineries	115	10354	1209	534	44	277	321[6]	305	16	5
Cement	115	527	320	63	63	–	63	55	8	13
Total Selected Manufactures	2468	30187	9634	11395	1033	797	1830	991	839	46%
Percentage of Total Manufactures	63%	23%	19%	29%	69%	99%	83%	n.a.	n.a.	n.a.
Percentage of GNP			4%							
Total Manufactures	3897	128889	51679	39244	1502	803	2205	n.a.	n.a.	n.a.
Percentage of Total Industry	84%	n.a.	n.a.	82%	78%	99%	81%	n.a.	n.a.	n.a.
Percentage of GNP			22%							
Total Industry[8]	4685	n.a.	n.a.	47676	1921	806	2727[9]	n.a.	n.a.	n.a.

n.a. not available

Self-Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by products. It does not include metallurgical coke.

CANADA 1979

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as of Total Energy Consumption
Pulp and Paper	919	9282	4539	6829	356	290	646	171	475	74%
Iron and Steel	918[2]	5859	2437	1147	329[5]	2	331	266	65	20
Smelting & Refining	207	4733[3]	2781	3310[4]	86	97	183	55	128	70
Industrial Chemicals	490	3977	1840	2039	165	114	279	136	143	51
Petroleum Refineries	136	12283	1432	1142	49	285	334[6]	303	31	10
Cement	143	843	382	95	70	–	70	60	10	15
Total Selected Manufactures	2813	36904	13211	14562	1055	788	1843	991	852	46%
Percentage of Total Manufactures	63%	24%	22%	32%	69%	98%	82%	n.a.	n.a.	n.a.
Percentage of GNP										
Total Manufactures	4484	152133	60623	46105	1540	804	2244	n.a.	n.a.	n.a.
Percentage of Total Industry	83%	n.a.	n.a.	80%	78%	99%	81%	n.a.	n.a.	n.a.
Percentage of GNP			23%							
Total Industry[8]	5361	n.a.	n.a.	57972	1979	808	2787[9]	n.a.	n.a.	n.a.

n.a. not available

Self Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by products It does not include metallurgical coke

CANADA 1980

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as of Total Energy Consumption
Pulp and Paper	1037	10908	5350	8214	341	286	627	153	474	76%
Iron and Steel	933[2]	6431	2545	1574	330[5]	2	332	251	81	25
Smelting & Refining	298	8058[3]	3727	5635[4]	100	112	212	64	148	70
Industrial Chemicals	573	4719	1926	2462	178	118	296	143	153	52
Petroleum Refineries	158	14415	1762	1250	44	278	322[6]	294	28	9
Cement	137	612	353	66	53	–	53	47	6	11
Total Selected Manufactures	3138	45154	15693	19201	1046	796	1842	952	890	48%
Percentage of Total Manufactures	62%	27%	24%	37%	69%	98%	79%	n.a.	n.a.	n.a.
Percentage of GNP			5%							
Total Manufactures	5023	168051	65960	51388	1525	812	2337	n.a.	n.a.	n.a.
Percentage of Total Industry	84%	n.a.	n.a.	78%	80%	99%	86%	n.a.	n.a.	n.a.
Percentage of GNP			23%							
Total Industry[8]	6014	n.a.	n.a.	65912	1914	816	2729[9]	n.a.	n.a.	n.a.

n.a. not available

Self Produced Energy includes self-developed electricity wood wastes, liquors and other combustible by products It does not include metallurgical coke

CANADA 1981

ASSESSMENT OF INDIRECT (HIDDEN) ENERGY EXPORTS

Industry by S.I.C.	Millions of Dollars: Cost of[1] Purchased Energy	Value of Shipment	Value Added	Value of Exports	Energy (Petajoules): Purchased Energy	Self-Produced Energy	Total Energy Consumption	Energy Content of[7] Commodities Destined for: Domestic Markets	Export Markets	Energy Content of Exports as % of Total Energy Consumption
Pulp and Paper	1051[e]	11425	n.a.	8746	332	275	607	146	461	76
Iron and Steel	920[2]	6817		1596	299[5]	2	301	231	70	23
Smelting & Refining	299	7169[3]		5013[4]	99	109	208	62	146	70
Industrial Chemicals	607	5420		2828	202	124	326	156	170	52
Petroleum Refineries	140	19139		1164	50	261	311[6]	292	19	7
Cement	133	698		69	48	–	48	43	5	10
Total Selected Manufactures	3150[e]	50868	n.a.	19416	1030	771	1801	930	871	48
Percentage of Total Manufactures	62%	27%		34%	73%	98%	82%	n.a.	n.a.	n.a.
Percentage of GNP			n.a.							
Total Manufactures	5081[e]	188238	n.a.	56450	1419	786	2205	n.a.	n.a.	n.a.
Percentage of Total Industry	84%	n.a.	n.a.	79%	76%	99%	83%	n.a.	n.a.	n.a.
Percentage of GNP										
Total Industry	6049[e]	n.a.	n.a.	71755	1873	791	2669[9]	n.a.	n.a.	n.a.

e) estimates

Value Added not available (n.a.) for 1981

Self Produced Energy includes: self-developed electricity wood wastes, liquors and other combustible by-products. It does not include metallurgical coke.

Assessment of Indirect (Hidden) Energy Exports for Canada Table

Notes:

1) In the Census of manufactures, small companies need not report fuel purchases separately; consequently the figures shown on this column are some 2-5% less than actual purchases.

2) The Census regards metallurgical coal and coke as materials and supplies consequently excluding them from fuel statistics. The figures used in this analysis are thus recalculated to include metallurgical coal and coke as fuel purchased. (They represent 2/3 of fuel purchased by this industry.)

3) For purposes of this analysis, Value of Shipments has been taken to represent industrial activity. However, in the case of the Smelting and Refining industry, Value of Shipments figures in the census of Manufacturers include metal bought for resale. In their place, gross output figures derived by the Input-Output Division of Statistics Canada are used to more accurately represent metal output from smelters.

4) Gold exports are excluded since there is no information as to whether supplies comprise monetary or smelted gold. Exported radioactive isotopes are also excluded for purposes of this analysis.

5) The Joule equivalents of metallurgical coal and coke are estimated from tonnage used. Although some coke fuel is produced within the establishment, no attempt is made to distinguish it from purchased coke in this analysis.

6) The Total Energy Consumption of Petroleum Refineries is obtained from the Quarterly (SC 57-003) where refineries' own energy requirements are shown.

7) Energy content of domestic and exported goods is calculated from the ratio of dollar values of exports to shipments. It should be noted, that export values of domestic supplies, used here, match with Balance of Payments values when Re-exports are added.

8) Whereas the Standard Industrial Classification (SIC) does include Agriculture and Fishing sectors, the energy accounting system treats these sectors under consumers identified as Residential and Farm, and Transportation.

9) This value is obtained from Energy Supply-Demand Table of Industrial consumption of fuels and electricity, line 28.

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